

The National Context for Science Teacher Education and Retention in the United States, 2007-2018: An Introduction to the Set of State Cases

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Our current IMPREST study examines secondary science teacher retention in four different states during an 12-year period spanning 2007 through 2018.¹ This time frame was chosen in order to follow the career trajectories of multiple cohorts of teachers over their first five years of teaching using the staffing data made available to us by the focus states.

Clearly, the ability of teachers to stay in the profession of teaching is influenced by multiple factors, one of which is the larger policy context of the state in which novice teachers first begin teaching. These state-level policies may relate to their entry into teaching, their preparation as teachers, and their day-to-day experiences working in schools. While certain federal-level policies may also impact novice teachers, education remains largely within the purview of the states, and thus remains our focus here.

In this set of cases we set out to describe the state policy contexts during the years of our study, including policies that were in place prior to 2007, in order to better make sense of the retention, mobility, and attrition of teachers in the focus states during the time frame of our study. The purpose of educational policy generally is to influence the attainment of policy goals, and policies are typically evaluated by whether those goals are attained (Burch, 2007). Here our purpose is not to evaluate the worthiness of any particular policy goal, or the impact of the state policy in achieving that goal, but rather, to better understand the role that certain state policies may play in influencing the career trajectories of beginning teachers.

In these four state case studies, we also attend to the collection, maintenance, and use of teacher data, given the role that these data play in informing subsequent changes in future state policy decisions. Given that state-level staffing data is central to our current study, it is also important to understand why and how these data are collected.

In these cases, we also attend to state policy that seeks to address aspects of teacher quality. It is likely that such policy impacts novice teachers with regard to issues such as initial certification, teacher evaluation and where applicable, teacher tenure.

These policies can be viewed from two different perspectives. The first is through a lens of *teacher as learner*, in which the goal of the policy is to advance a new teacher along a trajectory from novice to expert. The underlying assumption being that an experienced and more knowledgeable teacher is generally more desirable than a less-skilled novice.

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The second view is that of *teacher as worker*, in which the goal of the policy is to govern the labor of the individual teacher. In many situations, the goals of these two perspectives are aligned, but as will be seen the state cases, there are times when these two views of teachers are in tension and produce effects that work toward competing ends.

The National Teacher Education Policy Context

In examining the landscape of state teacher education policy from 2007 through 2018, it is important to take into account three important U.S. federal policy efforts that made an impact both on state-level education policy and the underlying data on which that policy was based. The first was the Higher Education Act of 1965, the second was No Child Left Behind of 2001/2002 (No Child Left Behind [NCLB], 2002; United States Department of Education, 2002), and the third was the Race To the Top grant program that was created as part of the American Recovery and Reinvestment Act of 2009. Each of these national efforts played an important role in shaping state-level policies in the United States, and we examine them in turn.

Title II of The Higher Education Act. Federal legislation and funding have long been a part of the landscape of teacher education in the U.S. One such piece of legislation was The Higher Education Act (HEA) of 1965, established with intentions to, “To strengthen the educational resources of our colleges and universities and to provide financial assistance for students in postsecondary and higher education” (HEA; P.L. 89-329) Specifically, this legislation aimed to increase the educational opportunities for lower and middle income families as well as provide assistance at the college and university level to deal with the issue of national poverty (McCants, 2003).

As it pertains to our study, teacher quality was addressed as a component of this new legislation. Originally designated under Title V in 1965, but reorganized and placed under Title II in the amendment of 1968, the HEA awarded, “fellowships for graduate study at institutions of higher education” in addition to the development and advancement of teacher preparation programs at the post-secondary level. In order to monitor the progress of these programs, HEA also established, “an Advisory Council on Quality Teacher Preparation” paying “particular attention to the effectiveness of these programs in attracting, preparing, and retaining highly qualified elementary and secondary school teachers,” (Higher Education Act of 1965, P.L. 89-329). In particular, the federal government intended to fund programs increasing and improving teacher quality through three distinct avenues: the attainment of graduate degrees by current elementary and secondary educators, the pursuit of undergraduates from majors outside of education into the field, and lastly, programs that supported the transition of career changers into the field (HEA; P.L. 89-329). Funding for such programs was contingent upon a stringent application process.

HEA has been amended seven times since 1965. The amendment of 1998 was designed to increase the type and amount of data collected from the universities who

received funding. Specifically, the Title II amendment required three annual reports in regards to teacher candidates including rates of passing on state certification and licensure examinations, additional reports from teacher preparation programs at institutions, as well as reports from State Departments of Education. The reports from states needed to include certification and licensure requirements for both traditional and alternate route teacher candidates, passing rates on the state certification assessments aligned to the College or University program in which the candidate participated, as well as additional pieces of data regarding the size and structure of the teacher preparation program (Paige, 2002).

In 2008 HEA was amended to address the disproportionate retention rates of novice teachers in low income schools across the U.S. by introducing the Teacher Quality Partnership (TQP) program. This program provided federal funding through Title II of HEA to programs that sought to prepare, “profession-ready teachers for high-need schools and subject areas” and to “develop master’s-level teaching residency programs,” (AACTE, 2019). Requirements for recipients of TQP grants included a focus on supporting novice teachers by requiring all programs to provide rigorous year-long clinical teacher preparation as well as include at least two years of induction support.

All four states in our study (North Carolina, New Jersey, Pennsylvania, and Wisconsin) have benefited from TQP funding of teacher preparation programs (USDOE, 2019). Funding for these grant programs has been subject to larger federal budgetary forces over the lifespan of the Higher Education Act, and as of this writing still enjoys broad support from states and institutes of higher education and remains “the only federal initiative directed to reforming and strengthening higher education-based teacher preparation programs,” (AACTE, 2019).

One last point related to the Higher Education Act is that as a consequence of the federal government’s role in financial aid programs (e.g. Stafford loans, Perkins loans, TEACH grants, Noyce Teacher Scholarships, etc.), states have been required since 1990 to report teacher shortage areas (TSAs) each year to the Department of Education. For the majority of states, the subject areas of science and mathematics have appeared on the TSA list from 2007 onward.

No Child Left Behind. The No Child Left Behind Act of 2002 was a reauthorization of the Secondary and Elementary Education Act of 1965, and the majority of the funds provided to the U.S. Department of Education by Congress were designated for local educational authorities (i.e. school districts) as a component of the anti-poverty supports of the original legislation. Most of this support took the form of so-called “Title I Funds,” which was aimed at students, teachers, and schools in a range of programs. NCLB also mandated public reporting requirements for a variety of student, school, and district performance indicators, including student achievement disaggregated by demographic factors.

The influence of the NCLB legislation on teacher education policy, the focus of the state cases here, was primarily felt in the mandate that states develop plans to ensure that teachers of academic subjects were “highly qualified.” NCLB defined a “Highly Qualified Teacher” as someone with, “state certification (including so-called “alternate route” certification), hold a bachelor’s degree, and have demonstrated subject area competency.” (USDOE, 2002, p.19).

After the passage of the legislation, all new hires--at least those in schools with Title I programs--had to meet these requirements. All existing teachers were required to become highly qualified by the end of the 2005-06 school year, and districts were mandated to use at least 5 percent of their Title I funds for professional development toward this goal. One of the defining features of the NCLB legislation was that there were clear consequences in terms of direct funding if the targets it set forth for states and districts were not attained.

With respect to secondary science teachers, this federal focus on Highly Qualified Teachers had a number of short-term impacts. The historically well-known difficulty in recruiting secondary science teachers took on a new urgency, and districts struggled to hire enough teachers who would meet the highly qualified status that NCLB demanded. Further, a number of states only offered a general science teaching certification, as opposed to a subject-specific license (e.g. chemistry, physics) with specific degree and content-area testing requirements, making the attainment of Highly Qualified Teacher status difficult for some experienced teachers. Out-of-field teaching for a part of one’s teaching schedule, a common practice in many districts out of necessity (Ingersoll, 2003), became an unsanctioned practice under NCLB. Further, the reporting requirements for certifying that teachers met the Highly Qualified Teacher status were broadly considered onerous by districts, because they superseded some state requirements.

In response to concerns raised by educators about the pressures these effects of the NCLB legislation placed on science teachers in particular, the U.S. Department of Education released new guidelines for states in how to respond to the Highly Qualified Teacher requirements: “States may determine—based on their current certification requirements—to allow science teachers to demonstrate that they are highly qualified either in “broad field” science or individual fields of science (such as physics, biology or chemistry).” (U.S. Department of Education, 2004). As will be shown in the state cases, some districts chose to label general or “broadfield” science teachers as highly qualified, while others held to a more strict standard. By 2009, the U.S. Department of Education recognized that its ambitious goals for staffing schools fully with highly qualified teachers had run up against the hard realities of the labor pool, noting that half of all districts and over 90 percent of “high-minority districts” reported difficulty attracting highly qualified applicants in secondary science (U.S. Department of Education, 2009). In the successor to NCLB, The Every Student Succeeds Act (ESSA) of 2015, the highly qualified teacher requirements were eliminated, and districts simply had to certify that their teachers satisfied

state certification requirements.

Race to the Top. The American Recovery and Reinvestment Act of 2009 (ARRA), developed in the wake of the 2008 global financial crisis, was created to provide an economic stimulus to multiple areas within the U.S. economy. The Race to the Top (RTTT) competitive grant program was integrated into this reform with the intention of leveraging the federal government's ability to provide economic stimulus while simultaneously creating a policy incentive aimed at modernizing state departments of education.

In an effort to achieve this goal, one of the RTTT grant requirements focused on improving the preparation of K-12 students for both college and the workforce. States were asked to submit competitive proposals in order to receive a share of the limited funding, and their applications were evaluated in light of six major categories. One category of the RTTT proposal criteria required states to implement improved data systems intended to, "measure student growth and success, and inform teachers and principals about how they can improve instruction" (United States Department of Education, 2009, p. 2). This category built on previous federal efforts to strengthen state data systems under the earlier Education Sciences Reform Act & Educational Technical Assistance Act of 2007.

RTTT also reflected a policy goal of "recruiting, developing, rewarding, and retaining effective teachers and principals, especially where they are needed most" (United States Department of Education, 2009, p. 2). One section of the RTTT application sought proposals for increasing the number of teachers in hard-to-staff subjects such as science, mathematics, and special education, among other areas.

The RTTT effort was designed to maximize the diversity of state-level approaches ensuring better student outcomes while maintaining a level of methodological rigor in the collection of data. One use of such data was for teacher quality purposes, which included both rewards and sanctions. The performance data collected could be used for purposes of offering additional compensation, or so-called "merit pay," as a way to reward high-quality teachers, but it could also be used as justification for the removal of "ineffective tenured and untenured teachers," (United States Department of Education, 2009, p. 9). As a whole, the Race to the Top program was designed to increase the amount, type, and quality of data collected with respect to teachers and students, expanding upon and standardizing the data already being collected as a result of NCLB.

Three of the four states under consideration in this current study (New Jersey, North Carolina, and Pennsylvania) were awarded grants in the Race to the Top program. Wisconsin submitted an application for each round, but was not a finalist.

Introduction to the State Cases

In each of the state profiles that follow in this series, we seek to better understand the state policy contexts that may have influenced the retention of novice science teachers during their first five years of teaching. We limit our analysis to the years examined in our empirical study, 2007-2018, simply because these are the years for which we have data on teacher retention, mobility, and attrition in each of the focus states.

Our look at this state-level landscape includes attending to policies concerning teacher education, certification, evaluation, and retention, as well as other state context data that may impact teacher retention. Given the role that data plays in determining teacher retention rates, each case will also describe the state data systems. We also examine specific state policies—to the extent they exist—concerning the mentoring and induction of novice teachers as well as policies that intend to increase the number of teachers of color and teachers for high-need schools. We will also describe the extent to which the Noyce Teacher Scholarship Program—itsself a federal effort to increase the number of science and mathematics teachers—has been active in each state as a producer of science teachers. Finally, we highlight any efforts within the state that are specifically aimed at science teachers that have the potential to influence retention.

References

American Association of Colleges of Teacher Education. (2019) Teacher Quality Partnership Act Fact Sheet. Retrieved online at:

https://secure.aacte.org/apps/rl/res_get.php?fid=1329&ref=rl

Burch, P. (2007). Educational policy and practice from the perspective of institutional theory: Crafting a wider lens. *Educational Researcher*, 36(2), 84-95. doi: 10.3102/0013189X07299792

Higher Education Act of 1965 section-by-section analysis. (1965). Washington, D.C.: U.S. Department of Health, Education, and Welfare, Office of Education.

McCants, J. (2003) The Early History of the Higher Education Act of 1965. National TRIO Clearinghouse. Retrieved online at:

http://www.pellinstitute.org/downloads/trio_clearinghouse-The_Early_History_of_the_HEA_of_1965.pdf

No Child Left Behind Act of 2001, P.L. 107-110, 20 U.S.C. § 6319 (2002).

Paige, R. (2002). Meeting the Highly Qualified Teachers Challenge: The Secretary's Annual Report on Teacher Quality. US Department of Education. Retrieved online at:

<https://title2.ed.gov/Public/ADATitleIIReport2002.pdf>

United States Department of Education. (2002). No child left behind: A desktop reference. Washington, D.C.: U.S. Dept. of Education, Office of the Under Secretary, Office of Elementary and Secondary Education.

U.S. Department of Education. (2004). New No Child Left Behind flexibility: Highly qualified teachers: Washington, DC: US Government Printing Office. Retrieved from <https://www2.ed.gov/nclb/methods/teachers/hqtflexibility.pdf>

United States Department of Education. (2009). Race to the Top Program Executive Summary, (November), 4. Retrieved from <https://www2.ed.gov/programs/racetothetop/executive-summary.pdf>

U.S. Department of Education. (2009). State and local implementation of the No Child Left Behind act volume VIII—teacher quality under nclb: Final report: Washington, DC: US Government Printing Office. Retrieved from <https://www2.ed.gov/rschstat/eval/teaching/nclb-final/report.pdf>

U.S. Department of Education (2019). Teacher Quality Partnership Grant Awards. Retrieved online at <https://www2.ed.gov/programs/tqpartnership/awards.html>