



Teacher Preparation and Performance in North Carolina Public Schools

This policy brief examines the distribution, effectiveness, and persistence of individuals entering the teaching profession with different forms of preparation. In comparison to teachers prepared by the University of North Carolina system, we find that: (1) North Carolina Independent College and University prepared teachers are less effective in middle grades mathematics and 5th and 8th grade science; (2) Out-of-state prepared teachers are less effective in elementary and high school grades and exhibit high rates of attrition; (3) Alternative entry teachers are less effective at the high school level, receive lower teacher evaluation ratings from their principal, and attrite at high rates; and (4) Teach For America Corps Members are more effective in secondary grades and STEM tested subjects and receive higher evaluation ratings from their principal but persist at very low rates. From these findings we conclude that:

1. *Teacher selection into preparation categories and the preparation or training received therein has significant effects on early-career teacher effectiveness and persistence.*
2. *North Carolina should consider policies, such as improved hiring procedures and more intensive supports for beginning teachers, to improve the effectiveness and persistence of out-of-state prepared and alternative entry teachers.*
3. *School districts and teacher preparation programs should consider ways to utilize best practices from Teach For America's recruitment, selection, and support model.*

Introduction

Given the importance of teachers to student achievement and later life outcomes, better research evidence is needed to understand the effectiveness and persistence of teachers entering the profession with different forms of preparation. At the state level, policy makers and university leadership can use this research to structure policies around teacher quality and improving teacher preparation, while at the local level, this research can assist school districts and principals with teacher hiring decisions. To address this research need, we classified North Carolina public school teachers into one of six policy-relevant categories that capture the preparation and formal education an individual held prior to first entering the teaching profession. Three of the categories

are for traditional teacher preparation: teachers prepared at the undergraduate, graduate, or licensure only level by the University of North Carolina (UNC) system, North Carolina Independent College and University (NC ICU) system or at an out-of-state university. The remaining three categories are for alternative preparation: Teach For America (TFA), Visiting International Faculty (VIF), and all other alternative entry teachers.¹ In this policy brief we examine: (1) the distribution of teachers to these categories; (2) the effectiveness of teachers from these categories, as measured by their value-added to student achievement and evaluation ratings; and (3) the persistence rates of teachers from these categories for three and five years, respectively, in North Carolina public schools.

¹ There is one additional category containing individuals who cannot be classified based on available data. We include these teachers in our analyses but do not report their results in this policy brief.

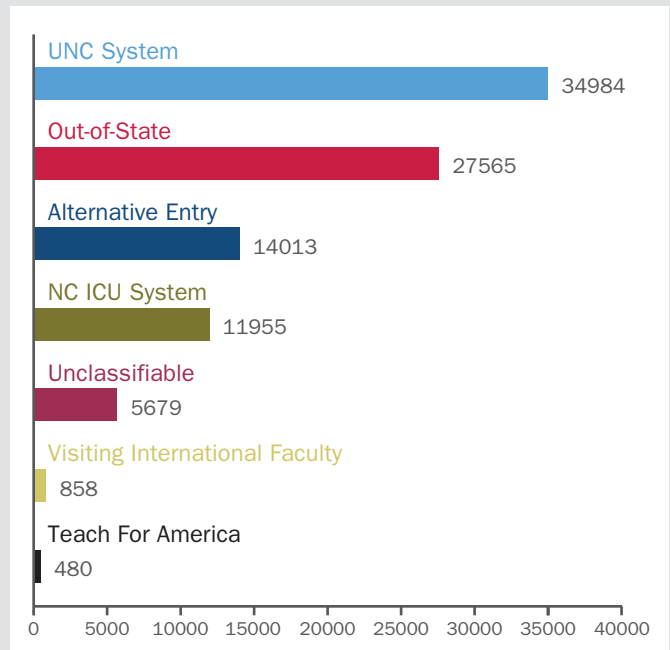
Background

In response to the rapid expansion of alternative routes into the teaching profession, many prior studies have investigated the effects of teacher preparation or certification on student achievement. Specifically, these studies have asked whether traditionally prepared/certified teachers produce larger student test score gains than their alternatively prepared/certified peers. While an important advancement, this research has generally suffered from two shortcomings: (1) the teacher categories examined have been too broad to facilitate informed policy action, particularly in light of the diversity in teacher preparation practices within traditional and alternative routes and (2) the categories have conflated teacher preparation and certification—preparation is the formal education and training an individual brings with them into the teaching profession, while certification is a teacher’s changing status with respect to a particular course or group of students. Therefore, we created preparation categories to address these concerns. For example, instead of one traditional preparation category we have three—UNC system, NC ICU system, and out-of-state—to better inform policy action. Furthermore, our categories are fixed characteristics, identifying a teacher’s preparation when first entering the profession. In the following sections we address our research objectives and provide more detail regarding our sample and methods.

How Are Teachers Distributed Across Preparation Categories?

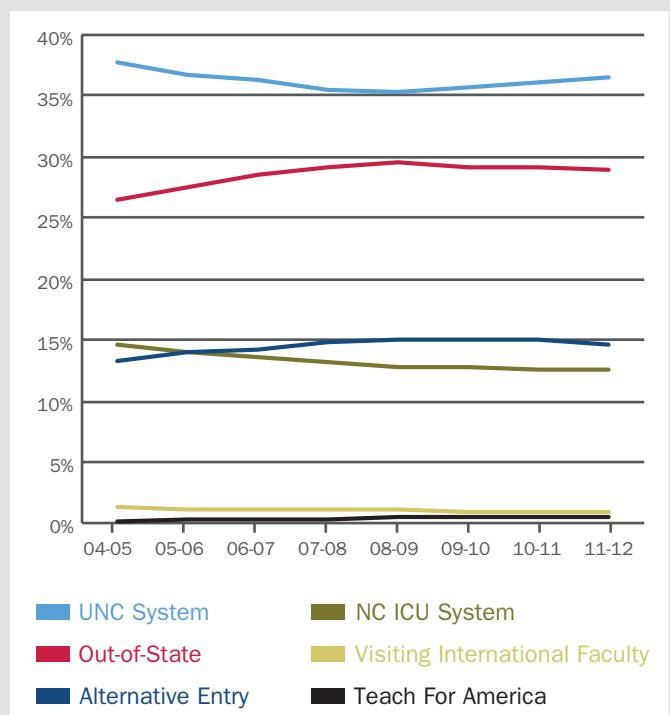
As shown in Figure 1a, the UNC system was the largest source of teachers in North Carolina public schools during the 2011-12 academic year, comprising 36.6 percent of the teacher workforce, followed by out-of-state prepared, alternative entry, and NC ICU prepared teachers at 28.9, 14.7, and 12.5 percent of the workforce, respectively. While Teach For America garners significant research and policy focus, their Corps Members accounted for only 0.5 percent of the state’s teachers in 2011-12. To complement these static values, Figure 1b displays trends in the distribution of teachers from the 2004-05 through 2011-12 academic years. In the figure’s initial years, the share of UNC system and NC ICU prepared teachers was decreasing as the share of out-of-state prepared and alternative entry teachers increased. More recently, however, the percentage of UNC system prepared teachers is increasing, while the share of out-of-state prepared and alternative entry teachers has leveled off.

Figure 1a: Teacher Preparation Categories in the 2011-12 Academic Year



NOTE: In the 2011-12 academic year there were 95,534 individuals paid as teachers in North Carolina public schools. This figure displays the teacher preparation categories arranged from largest (top) to smallest (bottom).

Figure 1b: Trends in Teacher Preparation Categories, 2004-05 Through 2011-12



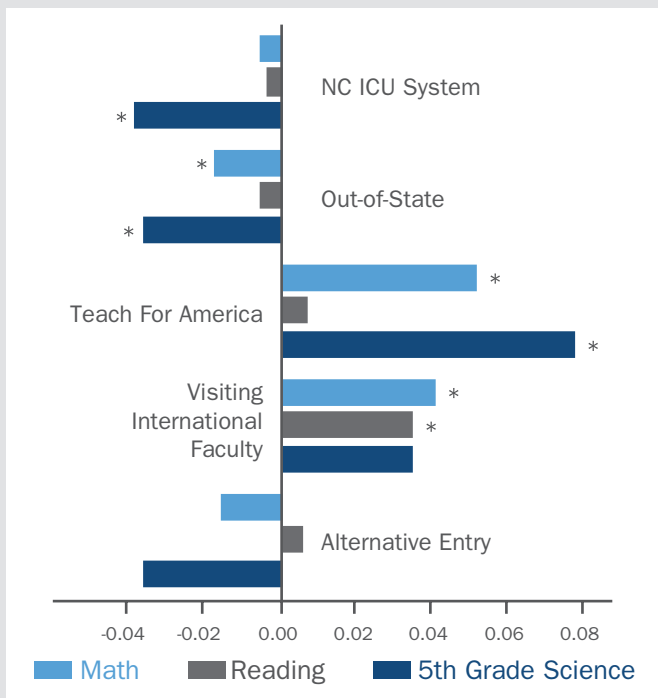
NOTE: This figure displays the percentage of teachers in each preparation category from 2004-05 through 2011-12.

How Effective Are Teachers With Different Forms of Preparation?

To assess teachers' value-added to student achievement gains we focused on teachers with less than five years experience in the 2007-08 through 2011-12 academic years. In elementary and middle grades we estimated models in mathematics, reading, and science (5th and 8th grades), while in high school, we estimated models in mathematics (algebra I, algebra II, and geometry), science (biology and physical science), social studies (U.S. history and civics), and English I. For our high school models, data were available in geometry in the 2007-08 through 2009-10 academic years and for all other tests in the 2007-08 through 2010-11 academic years. In 2011-12, North Carolina only assessed students in algebra I, biology, and English I. In our value-added models, UNC system prepared teachers were the reference category and we used a multi-level model with controls for student, classroom, teacher, and school characteristics. As a check on our preferred multi-level model, we also implemented models to compare the effectiveness of UNC system prepared teachers with that of other teachers in the same schools. Except where noted, all results were similar.

When examining Figures 2a-c several value-added findings stand out. First, UNC system prepared teachers outperform NC ICU prepared teachers in three comparisons—5th grade science, 8th grade science and middle grades mathematics.

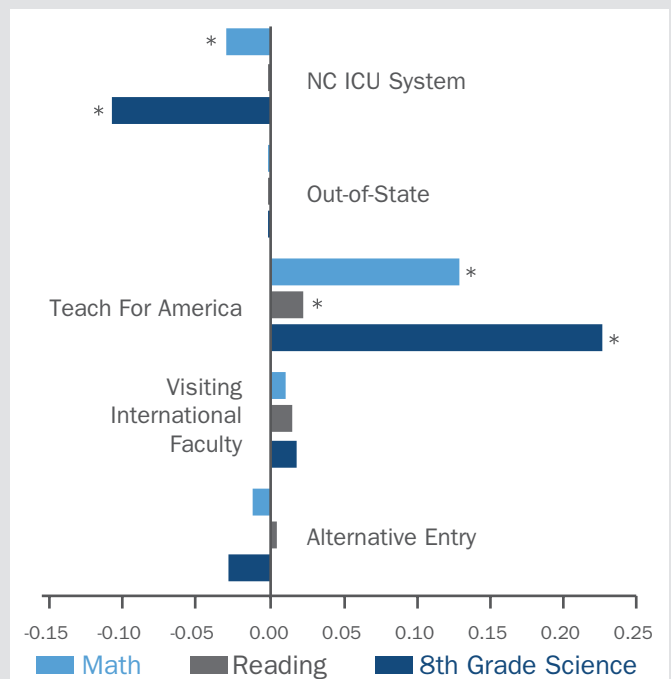
Figure 2a: Teacher Value-Added in Elementary Grades



NOTE: This figure illustrates the value-added of NC ICU, out-of-state, Teach For America, Visiting International Faculty and alternative entry teachers in reference to UNC system prepared teachers. An *at the end of a horizontal bar indicates statistically significant differences at the 0.05 level.

It may be useful to consider this impact in terms of days of student learning. For example, students in middle grades mathematics taught by a UNC system prepared teacher gain an average of nearly nineteen additional days of learning as compared to similar students taught by a NC ICU prepared teacher.² When comparing within schools, NC ICU prepared teachers were also less effective in elementary grades mathematics but were more effective in high school science. Second, UNC system prepared teachers are more effective than out-of-state prepared teachers in elementary grades mathematics and 5th grade science and more effective than out-of-state prepared and alternative entry teachers in high school mathematics, science, and social studies.

Figure 2b: Teacher Value-Added in Middle Grades

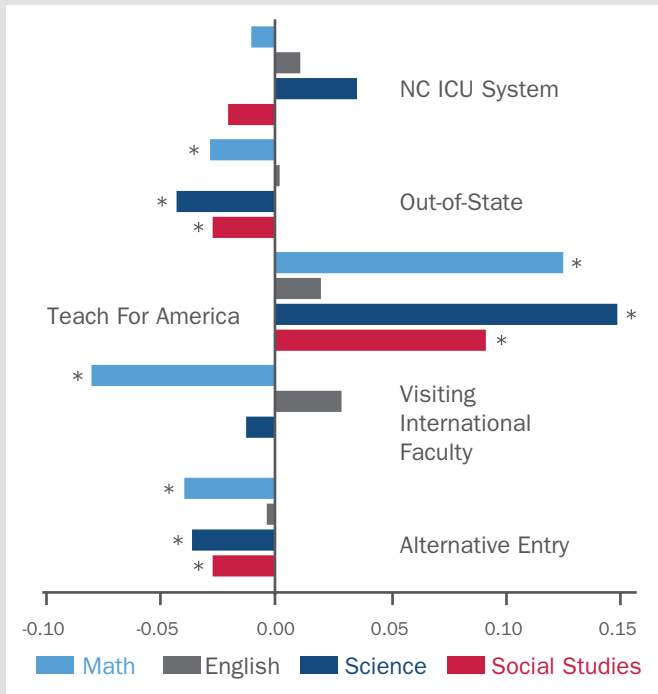


NOTE: This figure illustrates the value-added of NC ICU, out-of-state, Teach For America, Visiting International Faculty and alternative entry teachers in reference to UNC system prepared teachers. An *at the end of a horizontal bar indicates statistically significant differences at the 0.05 level.

In terms of days of student learning, elementary grades mathematics students taught by a UNC system prepared teacher gain an average of five days of additional learning as compared to similar students taught by an out-of-state prepared teacher. These results are particularly significant since out-of-state prepared teachers are highly concentrated in elementary grades and alternative entry teachers are highly concentrated in high school STEM subjects. Third, TFA Corps Members are the most effective early-career teachers in the state, outperforming UNC system prepared teachers in elementary mathematics and 5th grade science, middle grades mathematics, reading, and 8th grade science, and high school mathematics, science, and social studies. As shown in Figure 1a, however, the practical significance of

² For more information on calculating days equivalency see Henry, G.T., et al. (2011). Technical Report: UNC Teacher Preparation Program Effectiveness. Chapel Hill, NC: Carolina Institute for Public Policy.

Figure 2c: Teacher Value-Added in High School



NOTE: This figure illustrates the value-added of NC ICU, out-of-state, Teach For America, Visiting International Faculty and alternative entry teachers in reference to UNC system prepared teachers. An *at the end of a horizontal bar indicates statistically significant differences at the 0.05 level.

these results is limited since TFA Corps Members comprise less than one percent of the state’s teacher workforce. Finally, VIF teachers were more effective than UNC system prepared teachers in elementary grades mathematics and reading but were less effective in high school mathematics.

Since many important aspects of teaching quality may not be well-captured by value-added estimates and only a minority of teachers teach in tested grades/subjects, we also assessed the effectiveness of each preparation category using teachers’ North Carolina Professional Teaching Standards (NCPTS) evaluation ratings. There are five NCPTS – leadership, classroom environment, content knowledge, facilitating learning, and reflecting on practice – and for

each standard principals can rate teachers at one of five levels – not demonstrated, developing, proficient, accomplished, and distinguished. For these analyses we focused on teachers with less than five years experience in 2010-11 or 2011-12 and for each standard, we used models controlling for teacher and school characteristics to estimate the probability, relative to UNC system prepared teachers, that a teacher was rated as accomplished or distinguished (‘above proficient’). Overall, Table 1 shows that principals rate UNC system prepared teachers no differently than NC ICU or out-of-state prepared teachers. Across all five NCPTS, TFA Corps Members are more likely to be rated above proficient (e.g. Corps Members are 10.1 percent more likely than UNC system prepared teachers to be rated above proficient on Standard 1). Conversely, alternative entry teachers are less likely to be rated above proficient on all five NCPTS.

How Long Do Teachers From These Categories Persist in North Carolina?

Because teacher attrition entails significant financial costs to school districts and may adversely impact school stability and student achievement, we identified first year teachers in North Carolina public schools in 2005-06, 2006-07, 2007-08, and 2008-09 and longitudinally tracked each cohort’s persistence over a five year period. Figure 3 displays the three and five year persistence rates for each teacher preparation category. Overall, it is clear that those teachers prepared in North Carolina – from the public and private colleges and universities – display the greatest commitment to teaching in the state. Conversely, out-of-state prepared and alternative entry teachers exit North Carolina public schools at higher rates than their in-state prepared peers. This is likely attributable to a desire to return home or to the lowered costs of entry into the profession for alternatively prepared teachers. Finally, consistent with the two year teaching commitments of TFA, we find that Corps Members are the least likely to persist for three or five years in North Carolina public schools.

Table 1: Rating ‘Above Proficient’ on the NCPTS

Teacher Category	Standard 1: Leadership	Standard 2: Classroom Environment	Standard 3: Content Knowledge	Standard 4: Facilitating Learning	Standard 5: Reflecting on Practice
NC ICU System	0.013	0.010	-0.005	0.007	0.008
Out-of-State	-0.005	-0.008	-0.009	-0.009	-0.009
Teach For America	0.101*	0.068*	0.058*	0.064*	0.062*
Visiting International Faculty	-0.046*	0.032	0.029	0.011	-0.029
Alternative Entry	-0.054*	-0.037*	-0.024*	-0.044*	-0.048*

NOTE: This table displays the probability of rating above proficient for each of the five NCPTS in reference to UNC system prepared teachers. * Indicates statistical significance at the 0.05 level.

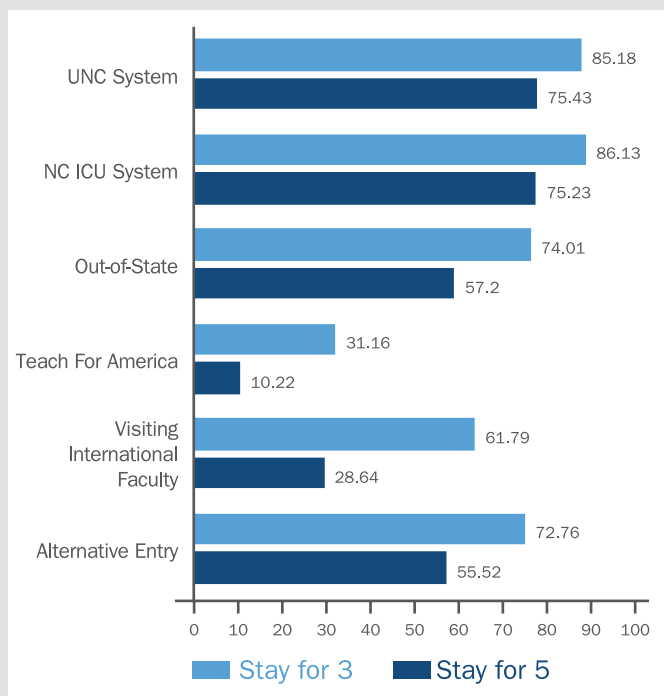
Discussion

In this policy brief we examined the distribution, effectiveness, and persistence of those entering the teaching profession with different forms of preparation. Overall, we found that the selection of individuals into these preparation categories and the training received therein has significant effects on student achievement gains, evaluation ratings, and the persistence of teachers. These results imply that state policies on teacher quality, the selection and preparation practices of teacher education programs, and the hiring practices of school districts can have substantial effects on outcomes of interest. Below, we discuss key implications of our findings.

First, the size of each preparation category or the concentration of teachers from a preparation category in a particular grade/subject influences the practical significance of our findings. For example, alternative entry teachers’

negative value-added effects in high school mathematics and science are especially troubling since these teachers comprise 30 and 47 percent of the early-career workforce in those subjects. Second, despite the *average* effectiveness differences between UNC system prepared and out-of-state prepared and alternative entry teachers, further research shows a high degree of overlap in the distributions of teacher effectiveness across these groups. Essentially, there are many highly effective out-of-state prepared and alternative entry teachers. This means that North Carolina should not take action to broadly curtail alternative entry programs or licensure reciprocity agreements, but rather, focus on improving the quality and persistence of these groups through more effective screening/hiring procedures and more intensive supports for beginning teachers. Finally, we argue that the effectiveness of Teach For America is not a challenge to traditional teacher preparation, especially since Corps Members comprise such a small percentage of the workforce, but rather, an opportunity to identify highly-effective recruitment, selection, and support practices that can be scaled-up to a university, district, or statewide level. Teacher education programs and school districts in North Carolina should implement selected practices, with future research investigating the effects of these reforms.

Figure 3: Teacher Persistence in North Carolina Public Schools



NOTE: For four cohorts of first-time teachers (2005-06, 2006-07, 2007-08, and 2008-09) this figure depicts the percentage of teachers who return for a 3rd and 5th year of teaching in North Carolina public schools.

For more research on this topic

Boyd, D., Goldhaber, D., Lankford, H., & Wyckoff, J. (2007). The effect of certification and preparation on teacher quality. *The Future of Children*, 17(1), 45–68.

Henry, G.T., Bastian, K.C., Fortner, C.K., Kershaw, D.C., Purtell, K.M., Thompson, C.L., & Zulli, R.A. (2014). Teacher preparation policies and their effects on student achievement. In press, *Education Finance and Policy*.

Henry, G.T., Purtell, K.M., Bastian, K.C., Fortner, C.K., Thompson, C.L., Campbell, S.L., & Patterson, K.M. (2014). The effects of teacher entry portals on student achievement. *Journal of Teacher Education*, 65(1), 7–23.

National Research Council. (2010). *Preparing Teachers: Building Evidence for Sound Policy*. Washington, D.C.: National Academies Press.

Study Authors: Kevin C. Bastian and Kristina M. Patterson

The Education Policy Initiative at Carolina is a policy research and outreach unit affiliated with the Department of Public Policy and housed in the College and Arts and Sciences at the University of North Carolina at Chapel Hill.



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



UNC
COLLEGE OF
ARTS & SCIENCES