In the following report, Hanover Research examines the relationship between teacher experience and student achievement and presents data on teacher experience ratios in selected high-achieving districts.
# TABLE OF CONTENTS

Executive Summary and Key Findings ........................................................................................................ 3

INTRODUCTION ........................................................................................................................................ 3

KEY FINDINGS ......................................................................................................................................... 3

Section I: Teacher Experience and Student Achievement ................................................................ 5

IMPACT OF TEACHER EXPERIENCE .................................................................................................. 5

Novice Teachers ..................................................................................................................................... 5

Experienced Teachers .......................................................................................................................... 7

FACTORS THAT MEDIATE THE IMPACT OF EXPERIENCE ................................................................ 9

In-school Variables .............................................................................................................................. 9

External Variables ............................................................................................................................... 12

Section II: Teacher Retention ............................................................................................................. 15

TEACHER ATTRITION ......................................................................................................................... 15

Attrition of Novice Teachers ................................................................................................................ 16

Impact of Teacher Attrition on Student Achievement ....................................................................... 17

TEACHER RETENTION IN RURAL SCHOOLS ..................................................................................... 17

Section III: Teacher Experience Ratios .............................................................................................. 20

NATIONAL TRENDS ........................................................................................................................... 20

STATE PROFILES .................................................................................................................................. 21

Delaware .................................................................................................................................................. 22

Maryland ............................................................................................................................................... 23

Massachusetts ....................................................................................................................................... 24

North Carolina ...................................................................................................................................... 25
EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION

Many education leaders believe that experienced teachers are more effective at improving student achievement than novice teachers. As a result, the Center for Analysis of Longitudinal Data in Education Research (CALDER) notes that the high concentration of novice teachers in high-needs schools “is commonly considered a major source of inequity across schools and, therefore, a target for redistribution.” At the same time, novice teachers are a source of new energy and skills and therefore may contribute intangible benefits to student learning.

This report employs multiple methodologies to investigate the optimal ratio of experience and inexperienced teachers in a district. First, this report discusses current research into the relationship between teacher experience (i.e., years of full-time classroom teaching experience) and student achievement. Second, this report examines other elements of the teaching experience that may impact student achievement, such as teacher education, school context, and teacher retention. Finally, this report presents a benchmarking analysis of teacher experience ratios in selected high-achieving districts (both urban/suburban and rural) in four states.

KEY FINDINGS

- Multiple studies find that new teachers are less effective than experienced teachers, but their performance improves rapidly during their first years of teaching. For example, one study estimated that the performance improvement that new teachers experience in their first year of teaching, as measured by their students’ standardized test scores, is approximately half of the cumulative improvement they would experience over their entire career. However, studies also find that teachers experience a “plateau” of professional growth after their first three to five years of teaching.

- Researching into performance growth among experienced teachers has produced mixed results. The finding that professional growth “plateaus” after five years indicates that the oldest, most experienced teachers may be no more effective than their comparatively younger, less-experienced colleagues. However, research shows that experienced teachers can and do grow professionally, albeit at slower rates that novice teachers.

- Multiple factors shape the impact of teacher experience on student achievement, including induction and mentoring programs, the socio-economic context of the school in which teachers teach, and the consistency of their grade assignments. In

---

addition, studies show that teachers who complete a pre-service preparation program with a student teaching program are more effective as novice teachers. Research into the relationship between certification or graduate education and student achievement has produced null or inconclusive results.

- **Younger, less-experienced teachers leave the profession at higher rates than their older, more-experienced peers.** Research indicates that young teachers are more likely to quit teaching if they earn a salary under $40,000, receive poor administrative support, are not assigned a mentor, and experience problems with student discipline. High teacher turnover can have a negative impact on student achievement, particularly among low-income and minority students.

- **Rural school districts retain novice teachers at rates similar to urban/suburban districts,** according to recent results from the Beginning Teacher Longitudinal Study (BTLS). However, rural areas offer fewer amenities compared to urban/suburban areas and frequently have a smaller pool of qualified candidates from which to hire new teachers. In addition, while teaching in rural schools may offer benefits to teachers, such as smaller class sizes and greater autonomy, teachers in rural schools often teach multiple grades and/or content areas, with fewer resources.

- **There appear to be no notable difference in the percentage of experienced and inexperienced teachers in rural versus urban/suburban districts examined for this report.** For example, in four large high-achieving Maryland districts, the percentage of teachers with 1-5 years of experience ranged from 22 to 30 percent. In addition, Hanover’s analysis of teacher experience levels in selected high-achieving districts in four states revealed that high-achieving districts employ slightly fewer novice teachers than their respective state averages. The analysis further revealed that teacher experience ratios are more likely to be influenced by a district’s size than its locale.
SECTION I: TEACHER EXPERIENCE AND STUDENT ACHIEVEMENT

A growing body of literature reveals that individual teachers can have a significant impact on student achievement. Using cross-sectional and longitudinal datasets, several studies have examined how a teacher’s performance, as measured by their students’ achievement on standardized tests, changes over the course of their career. This section first discusses research that attempts to isolate and quantify the impact of teacher experience, typically defined as years of full-time classroom teaching experience. Second, this section highlights research examining how other variables – ranging from school context to graduate education – may further shape the impact an individual teacher has on student achievement.

IMPACT OF TEACHER EXPERIENCE

NOVICE TEACHERS

Researchers typically define novice teachers (also referred to as “beginning teachers” or “inexperienced teachers”) as teachers in the first three to five years of their career. Novice teachers, write Brown University researchers Papay and Kraft (2014), are in a developmental phase of their career; they are “simply trying to survive in the classroom as they build key classroom management skills, learn the curriculum, and add to their instructional abilities.”

Overall, studies find that new teachers are less effective than experienced teachers, but their performance improves rapidly during their first years of teaching. For example, a 2008 study published in the Journal of Policy Analysis and Management found that the year-on-year productivity gains among novice teachers increased dramatically in their first five years of teaching, particularly their first year. Using a longitudinal dataset from the New York City Public Schools, which contained data on more than 450,000 students per year between 1998-99 and 2004-05, the researchers estimated that the first year experience gain amounted to approximately half of the cumulative experience gained over the course of the teachers’ careers. In addition, as shown in Figure 1.1 on the following page, the

---

study found that the gains were more pronounced among teachers who taught students in Grades 4-5 than teachers of Grade 6-8 students. 

Figure 1.1: Impact of Teacher Experience on Student Achievement

![Graph showing the impact of teacher experience on student achievement.](image)

The results of the New York City study reflect similar conclusions reported elsewhere in the literature: that the impact of early-career experience is most consistent in the elementary and middle school grades, particularly in mathematics. For example, a 2007 study published by the Center for Analysis of Longitudinal Data (CALDER) examined an administrative dataset containing student achievement and teacher experience data for all public school students in Florida between 1999-2000 and 2004-05. The study found that the productivity gains increased with experience among elementary and middle school teachers. However, increased early-career experience had little impact on the performance of high school teachers. The study also noted an important caveat: that most elementary students study in self-contained classrooms with a single teacher, while secondary-level students typically have different teachers for each subject area. This difference in teacher-student configurations between elementary and secondary grades may explain the

---

7 Ibid., pp. 809–810.
8 Ibid., p. 810.
11 Ibid., p. 30.
12 Ibid., pp. 16–17.
apparent concentration of teacher experience literature that focuses on elementary grades. In addition, it may undermine comparisons of teacher impact estimates across grade spans.

A second common finding in the literature is that the marginal returns to each year of experience fade rapidly after the first three to five years. As shown in Figure 1.1, the returns to teacher experience in New York City “plateaued” after the five-year mark. Similarly, a 2015 study published by The New Teacher Project (TNTP) found that the performance growth between a first-year teacher and a fifth-year teacher was more than nine times the performance growth between a fifth-year teacher and a twentieth-year teacher. TNTP indicated that these mid- and later-career growth rates could increase, noting that “[m]any teachers’ professional growth plateaus while they still have ample room to improve.”

In a similar study, a 2009 RAND study calculated the impact on student achievement of each five-year increase in teacher experience throughout the teacher’s career. The study, which examined data on more than 300,000 students and 16,000 teachers in Los Angeles Unified School District, found that the role of experience was small. Specifically, each five-year increase was associated with 0.5–0.8 percentage points of improvement on those exams. The study did not report the productivity gains of teachers within individual experience bands, but noted that the small effect size “largely reflects poor outcomes for teachers during their first year or two in the classroom.”

Some researchers have expressed concern that the demonstrated “plateau” in professional growth may be influenced by high attrition rates among novice teachers. However, a 2012 study published in the journal *Economics of Education* confirmed that this finding remains constant, even after controlling for the non-random attrition of teachers from a district.

However, the study did reveal some factors of the novice teacher experience that may contribute to teacher attrition, including whether they are assigned to higher performing students and whether they make the effort to earn advanced degrees or certifications.

**EXPERIENCED TEACHERS**

Research into the performance growth among experienced teachers has produced mixed results. For example, the finding that the benefits of teacher experience plateau after a teacher’s first few years in the classroom indicates that performance growth among older,

---

16 Ibid., p. 1.
19 Ibid., p. 31.
more experienced teachers is limited. For example, a 2008 CALDER study found that teachers with 20 years of experience, while more effective than teachers with no experience, are no more effective than teachers who have been teaching for only five years.  

Some research even suggests that the most experienced teachers – those with more than 25 years of experience – may be less effective than their less-experienced peers.

On the other hand, recent studies have begun to challenge what one pair of researchers called “the standard policy conclusion that teachers do not improve after their first three to five years of their career.” In a 2014 study, researchers at Brown University examined data from nearly 9,000 teachers and over 100,000 students from a large, urban school district and found that, like the results of prior studies, the teachers improved rapidly during their first five years. Similar to prior studies, the impact of experience was greater in mathematics than in reading. However, the researchers applied alternative statistical techniques to correct what they identified as negative biases in prior models against more experienced teachers. As a result, one of their adjusted models found that teachers do continue to experience productivity gains between years five and 15, but that returns over this period amount to between 45 and 60 percent of the total gains during their first five years.

Despite the inconclusive results from the research, researchers at RAND argue that positive secondary effects may result from retaining experienced teachers:

High levels of teacher experience may have important benefits for schools, even if teacher experience is weakly related to student achievement. Longer teacher retention saves money in recruiting and training teachers. These savings may indirectly affect resources that are ultimately available for classroom instruction and improved student achievement.

In addition, Duke University researcher Helen Ladd, who conducted the 2008 CALDER study of teacher experience in North Carolina schools, argues that experienced teachers help strengthen the overall educational culture of the schools in which they teach:

Our research in progress suggests that, as North Carolina middle school teachers gain experience, they become increasingly adept at doing other important things – like reducing student absences and encouraging students to read for recreational purposes outside of the classroom. More experienced teachers often mentor young teachers and help to create and maintain a strong school community.

---

23 Ibid., pp. 6, 21–22.
24 Ibid., pp. 27–28.
FACTORS THAT MEDIATE THE IMPACT OF EXPERIENCE

While many of the studies discussed here measure teacher experience only, researchers noted that a variety of factors may contribute to teacher productivity growth during their early career, including supportive work environments and effective colleagues. Some variables, such as mentoring and school poverty, are factors that can enhance or undermine a teacher’s professional growth. In addition, many researchers use teacher education – either pre-service or additional graduate education completed during a teacher’s career – as proxy measures of the knowledge and skills that novice teachers possess when they begin teaching, and the additional knowledge and skills they may earn at later points in their career.

IN-SCHOOL VARIABLES

INDUCTION AND MENTORING

Multiple studies find that teachers who participate in induction and/or mentoring programs during their first years of teaching have a greater impact on student achievement. A 2011 review of literature on the impact of teacher induction programs published in the Review of Education Research found that such programs have a positive, if varied, impact on teacher instructional practice and student achievement. In the review, researchers Ingersoll and Strong highlighted a 2004 study of induction programs for novice teachers in California. Mentoring was the central feature of the induction programs studied; other induction supports were optional. Using teacher interviews and surveys, the study found that teachers who participated in more elements of the induction program performed better on nine measures of classroom practice, including asking students questions, providing feedback, and checking for understanding. A weakness of the study, however, is the small sample size of teachers included, which was likely not representative of the total teacher population.

In addition, the Ingersoll and Strong review included four studies of induction programs in California and New York City that examined the impact of program participation on student achievement. The review cited a 2008 study by Fletcher et al. that compared the student test scores of novice teachers in a high-intensity mentoring program to more experienced

---

32 Ibid., p. 29.
34 Ibid., p. 25.
teachers. The study found that while the novice teachers were often assigned to classrooms with lower-achieving students, their students demonstrated, on average, achievement gains equal to or greater than those of the more experienced teachers. The review noted that the mentorship programs varied from school to school (ranging from a teacher mentor with release time and a 1:15 caseload to a “buddy” system with no release time for the mentor teacher). Similarly, it was not possible to discern whether or not the more experienced teachers had participated in any type of mentoring program.

Perhaps the largest and most rigorous study of teacher induction and mentoring programs is a 2010 study prepared for the U.S. Department of Education by Mathematica Policy Research. The study examined data for 1,009 teachers in 17 large, urban, and low-income districts. Using a randomized control trial design, the study randomly assigned some teachers to a treatment group that received a “comprehensive,” one to two year induction program that included mentoring and was delivered by the Educational Testing Service (ETS) or the New Teacher Center (NTC). The remaining teachers were assigned to a control group that did not participate in the program. The study found that teachers in the two groups showed no difference in classroom practices at the midpoint of their first year (teachers were not evaluated after the first year). However, the study found that by the third year, students of teachers in the treatment group performed better on standardized tests, equivalent to moving from the 50th to 54th percentile in reading, and to the 58th percentile in math. Ingersoll and Strong note, however, that the results of this study apply to the two programs offered by ETS and NTC only, and that the study did not account for any other types of support services that teachers in either the control or treatment groups may have received during the study period.

**STUDENT POVERTY**

In addition, certain features of the school context, particularly the socio-economic status of students, can shape a teacher’s professional growth. Researchers and policy advocates have long noted that novice teachers and less-effective teachers are often concentrated in high-poverty schools. A 2010 study of schools in North Carolina and Florida confirmed this observation, noting that the disparity was driven primarily by the “relatively poor

---

performance of the least effective teachers in high poverty schools.”\textsuperscript{42} The study, published by CALDER, found that among highly-effective teachers, those who taught in high-poverty schools were as effective as their peers in low-poverty schools. However, as Figure 1.2 illustrates below, the study also found that teachers in high-poverty schools also experienced lower productivity gains compared to their peers in low-poverty schools.\textsuperscript{43} According to the study, the results indicate that “the effect of experience on teacher productivity depends on the setting in which the experience is acquired.”\textsuperscript{44}

**Figure 1.2: Impact of Teacher Experience and Poverty in North Carolina**

![Reading](Reading.png)

Source: CALDER\textsuperscript{45}

**GRADE ASSIGNMENTS**

Additionally, research indicates that 	extbf{teachers improve more rapidly when they continue to teach the same grade.} In a 2009 study, Cornell University professor Ben Ost examined whether there is a difference between the impact of general experience in the classroom and experience teaching a specific grade or subject. Ost’s study used longitudinal data from North Carolina, and specifically examined student standardized test scores in Grades 3 through 8 between years 1995 and 2007. The analysis revealed that students of teachers who teach the same grade for the first five years of their career show 39 percent greater improvement in student math scores when compared to students who teach different

\textsuperscript{42} Sass, T. et al. “Value Added of Teachers in High-Poverty Schools and Lower-Poverty Schools.” (Center for Analysis of Longitudinal Data in Education Research, November 2010). p. 22.  
\textsuperscript{43} Ibid., p. iii.  
\textsuperscript{44} Ibid., p. 22.  
grades every year. Similarly, a 2008 study published in the journal *Educational Assessment, Evaluation, and Accountability* used a smaller sample size and produced comparable results.

**EXTERNAL VARIABLES**

**PRE-SERVICE PREPARATION**

Research demonstrates that novice teachers have a greater impact on student achievement if they attend a teacher preparation program with a student teaching component. In particular, a 2008 NBER working paper, later published in the journal *Education Evaluation and Policy Analysis*, found that first-year teachers who had the opportunity to participate in a well-supervised student teaching program had a greater impact on their students’ math and ELA standardized test scores than teachers who did not have prior student teaching experience.

Some researchers have used novice teachers’ performance on state licensure/certification tests as a measure of the knowledge and skills the teachers possess at the start of their career. For example, the 2007 CALDER study examined the relationship between the scores novice teachers received on elementary education and content tests and their students’ performance on elementary math tests. The analysis revealed that teachers who scored higher on these tests were associated with improved student achievement. Specifically, teacher scores that were two or more standard deviations above average were associated with student gains of 0.068 standard deviations more than an average-scoring teacher. However, the 2009 RAND study of student and teacher data from Los Angeles Unified School District found that teacher licensure test scores had no impact on student test scores.

**CERTIFICATION**

Research conclusions regarding the impact of teacher certification status on student achievement have been inconsistent. Certification/licensing exams for new teachers are often viewed as a “minimum screen” for entry into the teaching profession. For example,
2005 study published in the journal *Education Policy and Analysis Archives* found that certified teachers “consistently produce stronger student achievement gains than do uncertified teachers,” including uncertified teachers recruited through the Teach for America Program.53 Using longitudinal data from 212,000 Grade 4 and Grade 5 students and their teachers in Houston Independent School District, including their performance on six reading and math assessments, the study reported that uncertified teachers slowed student progress by half of one month to one full month per year.54

However, a 2006 study published by the National Bureau of Economic Research (NBER) estimated the impact of more than 10,000 novice teachers in New York City, including uncertified teachers hired through the New York Teaching Fellows and Teach for America programs.55 The study found that the teachers’ certification status had little impact on their students’ Grade 4 and Grade 8 reading and mathematics test scores, and was therefore not a reliable indicator of the teachers’ future effectiveness.56 A smaller study involving students and teachers in a single Tennessee school district also found that a teacher’s certification status had no significant relationship with their students’ performance on standardized tests, with the exception of teachers who taught secondary-level math.57

Similarly, a 2007 CALDER study found that teachers with National Board Certification are no more effective than teachers without the credential. Specifically, the study noted, National Board certification “appears to identify effective teachers but does not make them more effective.”58

**Graduate Education**

Data collected by the National Center for Education Statistics (NCES) show that nearly two-thirds of teachers in the United States receive a graduate degree at some point in their career. (The data do not discern when the teacher earned the degree, or whether the degree is in a field related to the subject they teach). As shown in Figure 1.3 on the following page, teachers in South Carolina earn graduate degrees at a rate slightly higher than the national average.

---

54 Ibid., pp. 5, 18.
55 Ibid., p. 2.
Figure 1.3: Teacher Education Levels in the United States and South Carolina (2011-12)

However, research indicates that a teacher’s possession of a graduate degree does not impact student achievement. For example, the 2007 CALDER study found that overall, possession of a graduate degree had a small or negative impact on teacher performance. Possession of a master’s degree had a greater impact if the teacher earned the degree five or more years after they began teaching. Similarly, a 2014 study published in the AASA Journal of Scholarship and Practice produced comparable results. The study examined the TAKS standardized reading assessment scores of students in 1,026 Texas school districts, and found that graduate education had a “limited positive impact” on students’ reading achievement. However, the study did not distinguish between different types of graduate degrees, the setting of the graduate training, or the experience level at which the teacher earned the degree. The study’s authors emphasized that further research is necessary, noting:

It is possible that teachers with graduate degrees are differentially assigned responsibilities that include working with students who already perform at higher academic levels. Teachers new to the profession are often assigned responsibilities that include teaching in some of the most challenging situations.

---

59 Ibid.
62 Ibid.
SECTION II: TEACHER RETENTION

Education leaders identify teacher retention – of both novice and experienced teachers – as a key challenge facing school districts. As one report from the National Education Association explains, “[h]igh teacher turnover requires schools to spend costly time on recruiting, mentoring, socializing, and training newcomers – only to see the trained teachers move on.” This section presents a brief overview of research examining teacher retention at different experience levels and presents special considerations for rural school districts.

TEACHER ATTRITION

Younger, less-experienced teachers are more likely to leave the profession than older teachers. Using data from the more than 200,000 teachers surveyed by the nationally representative Schools and Staffing Survey (SASS), researcher Richard Ingersoll estimated that the between 40 and 50 percent of new teachers leave their position within the first five years on the job. Ingersoll’s 2003 study of teacher retention rates found that the most common reasons given by teachers (of all experience levels) who left the profession were:

- Poor Salary (61 percent)
- Poor Administrative Support (32 percent)
- Student Discipline Problems (24 percent)
- Poor Student Motivation (18 percent)
- Lack of Faculty Influence and Autonomy (15 percent)

More recent data from the Beginning Teacher Longitudinal Study (BLTS) indicate that the novice teacher attrition rate may in fact be lower than Ingersoll’s estimate of 40 to 50 percent. The BLTS followed a nationally representative cohort of approximately 156,000 beginning public school teachers starting in 2007-08. The study found that during the first four years of teaching, 15.5 percent of teachers under age 30 left the profession, whereas 21.9 percent of new teachers over age 30 quit teaching. By comparison, the average attrition rate for all beginning teachers was 17.3 percent. In addition, data from the BLTS show that teachers are more likely to leave the profession within four years if they are male, earn less than $40,000 per year, hold a master’s degree, and were not assigned a mentor.

Notably, there is no difference in attrition rates between urban/suburban and rural/town teachers. Figure 2.1, below, presents additional results from the BLTS survey.

**Figure 2.1: Teacher Attrition After Four Years by Characteristic**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>21.9%</td>
</tr>
<tr>
<td>Less than 30 y.o.</td>
<td>15.5%</td>
</tr>
<tr>
<td>Gender</td>
<td>15.7%</td>
</tr>
<tr>
<td>Female</td>
<td>21.9%</td>
</tr>
<tr>
<td>Male</td>
<td>19.3%</td>
</tr>
<tr>
<td>Race/Eth.</td>
<td>16.7%</td>
</tr>
<tr>
<td>All other races/ethnicities</td>
<td>19.3%</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>11.3%</td>
</tr>
<tr>
<td>Base Salary</td>
<td>42.8%</td>
</tr>
<tr>
<td>$40,000 or more</td>
<td>19.6%</td>
</tr>
<tr>
<td>Less than $40,000</td>
<td>14.2%</td>
</tr>
<tr>
<td>Highest Degree</td>
<td>17.2%</td>
</tr>
<tr>
<td>Higher than a master’s degree</td>
<td>38.5%</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>14.2%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>17.2%</td>
</tr>
<tr>
<td>Less than a bachelor’s degree</td>
<td>21.9%</td>
</tr>
<tr>
<td>Mentor Cert.</td>
<td>16.9%</td>
</tr>
<tr>
<td>Regular</td>
<td>20.8%</td>
</tr>
<tr>
<td>Alternative</td>
<td>14.5%</td>
</tr>
<tr>
<td>Yes</td>
<td>28.6%</td>
</tr>
<tr>
<td>No</td>
<td>13.6%</td>
</tr>
<tr>
<td>Grade Level</td>
<td>27.2%</td>
</tr>
<tr>
<td>Elementary</td>
<td>17.5%</td>
</tr>
<tr>
<td>Secondary</td>
<td>17.2%</td>
</tr>
<tr>
<td>Locale</td>
<td></td>
</tr>
<tr>
<td>Town/rural</td>
<td></td>
</tr>
<tr>
<td>City/suburban</td>
<td></td>
</tr>
<tr>
<td>All beginning teachers</td>
<td>17.3%</td>
</tr>
</tbody>
</table>

Source: Institute of Education Sciences

**ATTRITION OF NOVICE TEACHERS**

Research indicates that the quality of support that teachers receive in their first few years of teaching may shape their decision to stay in the profession. Specifically, research into the impact of induction programs has found that participation in such programs increases participant teachers’ satisfaction, commitment to teaching, and retention. However, the 2011 Mathematica study on teacher induction programs found that participation in the programs had no statistical impact on teacher retention during the first four years.

---

68 Ibid., pp. 7-9.
69 Figure content adapted from: Ibid., pp. 7–9.
In addition, a 2015 Mathematica report on Teach for America (TFA) found that most of the highly-educated young teachers recruited through the program do not intend to remain in the profession. The report included results of a limited survey of 135 teachers who were completing their first year of teaching in 2012-13. The survey revealed that 87.5 percent of the TFA teachers planned to leave the profession, most within two years, compared to 26.3 percent on non-TFA teachers. Figure 2.2, below, displays further results of the Mathematica report’s survey.

![Figure 2.2: Teacher Attrition Among TFA and non-TFA Teachers](image)

<table>
<thead>
<tr>
<th>Do not plan to spend the rest of career as a classroom teacher</th>
<th>TFA TEACHERS N=59</th>
<th>COMPARISON TEACHERS N=76</th>
</tr>
</thead>
<tbody>
<tr>
<td>For those who plan to leave the teaching profession:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of years plan to teach after the 2012-13 school year (average)</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>0 years</td>
<td>25.0%</td>
<td>6.7%</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>50.0%</td>
<td>46.7%</td>
</tr>
<tr>
<td>3 to 5 years</td>
<td>14.3%</td>
<td>26.7%</td>
</tr>
<tr>
<td>6 or more years</td>
<td>0.0%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Unsure</td>
<td>10.7%</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

Source: Mathematica Policy Research

**IMPACT OF TEACHER ATTRITION ON STUDENT ACHIEVEMENT**

Research indicates that high teacher turnover can have a negative impact on student achievement. For example, a 2013 study involving 850,000 students in New York City public schools found that students in grades with high levels of teacher turnover showed poorer performance in English Language Arts and math when compared to students in grades with lower turnover. In particular, student math scores fell by 8.2 to 10.2 percent of a standard deviation in years when a grade experienced 100 percent turnover compared to years with no turnover. The study, published in the *American Educational Research Journal*, found the effect was particularly pronounced in schools with high concentrations of low-income and minority students. The effect sizes were slightly larger in math than in English Language Arts.

**TEACHER RETENTION IN RURAL SCHOOLS**

Most of the available empirical research on the impact of teacher experience and education on student achievement was conducted in large, urban school districts. This is likely due to

---

73 Ibid.
75 Ibid., p. 18.
the comprehensive and large scale of the datasets that these districts can provide to researchers. Those studies that use statewide datasets, such as the CALDER study of North Carolina data discussed above, do not make any distinction between the different locales in which schools and districts may be situated.

However, **rural school districts have distinct characteristics that may impact their ability to recruit and retain teachers**, particularly teachers from outside their region. In a 2012 report on rural teacher recruitment, researcher Luke Miller of University of Virginia’s Center on Education Policy and Workforce Competitiveness noted that many rural school administrators cited the comparatively poor amenities in rural communities as a reason why they struggle to attract qualified teacher candidates. In particular, teachers may not be attracted to rural communities with weak local economies that lack access to housing, medical care, and shopping. 76 Similarly, a 2005 study published in the *Journal of Policy Analysis and Management* found that prospective teachers tend to limit their job search to small areas close to their hometowns. 77 Because a lower percentage of the population attends college in rural areas than in urban or suburban areas, this trend may contribute to the shortage of qualified teacher applicants in rural areas. 78

In addition, **factors specific to the rural teaching environment may mediate the impact teachers have on their students**, regardless of experience. For example, a review of effective rural teacher preparation programs by REL-Midwest outlined several ways in which teaching in rural schools may differ from more urban and suburban settings, including: 79

- Teaching with limited resources;
- Teaching two or more content areas; and
- Teaching two or more grade levels in the same room.

Additional factors, such as social and collegial isolation, low salaries, and greater responsibility to support students’ socio-emotional development may make rural teaching more challenging and make it harder to attract teachers to teach in rural schools. 80

At the same time, a study of rural teaching using data from four administrations of the NCES Schools and Staffing Survey from 1999-2011 finds that teachers in rural schools report more personal influence in their schools and autonomy in their classrooms than teachers in urban

---


80 Ibid., p. iii.
or suburban schools. In addition, some research suggests that rural classrooms tend to have lower student to teacher ratios and fewer disciplinary problems than urban or suburban schools.

Compared to urban and suburban schools, rural schools experience distinctive types of poverty and mobility. For example, a 2007 article on rural schools in the journal *The Future of Children* reported that schools in rural areas with heavily agricultural economies may serve large numbers of children from migrant farm families. These students may change schools often, have higher absence rates, and experience malnutrition and substandard housing. In addition, rural schools may struggle to integrate migrant students into their academic program and school culture. Schools in areas with industries that rely heavily on immigrant labor may experience increased enrollment of low-income English Language Learners (ELLs), which may be particularly challenging for teachers with no prior experience teaching ELLs.

---

83 Ibid., p. 166.
SECTION III: TEACHER EXPERIENCE RATIOS

This section presents data on teacher experience levels in the U.S. and across selected school districts. In particular, the state- and district-level benchmarking analysis provides insight into how teacher experience ratios – as measured by years of teaching experience or age – may compare across urban/suburban and rural districts, and among districts of average and above-average achievement.

NATIONAL TRENDS

Most U.S. public school teachers have between three and 20 years of full-time teaching experience. Data from the U.S. Department of Education, shown below in Figure 3.1, reveal that approximately 9 percent of school teachers are novice teachers with fewer than three years of full-time experience. The data show that, compared to the U.S. average and neighboring states, South Carolina has a similar percentage of novice teachers, but a higher percentage of very experienced teachers with more than 20 years of classroom experience. Furthermore, the data demonstrate that teacher experience ratios in public schools are similar across genders and grade levels. By comparison, private schools are twice as likely to employ teachers with fewer than three years of full-time teaching experience.

Figure 3.1: Teacher Experience in U.S. Schools (2011-12)

Source: NCES

---

85 [1] Ibid.
86 Ibid.
STATE PROFILES

State- and district-level datasets provide insight into how teacher experience ratios may vary between average and high-achieving districts, and between districts located in different locales (i.e., urban, suburban, and rural). Four states – Delaware, Maryland, Massachusetts, and North Carolina – publish current data on teacher experience levels at the district level. Hanover examined student standardized assessment scores and selected high-achieving school districts (i.e. districts that score above the state average) that are situated in both urban/suburban and rural locales. The following benchmarking analysis of these districts compares the teacher experience ratios in these districts to state averages. Figure 3.2 through Figure 3.9 present descriptive data about the selected districts, and comparative charts that display teacher experience ratios for each district.

There is no notable variation in teacher experience levels between rural and urban/suburban districts in the comparison group. While the data for districts in some states, particularly Delaware and Massachusetts, reveals wide disparities in teacher experience levels within the state, these differences may be attributed, in part, to the small size of the districts examined (Figure 3.3 and Figure 3.7). In Maryland and North Carolina, which have comparatively larger enrollments and FTE teaching staff, the variation amounts to no more than a few percentage points (Figure 3.5 and Figure 3.9).

High-achieving districts employ slightly fewer novice teachers than their respective state averages. This trend is particularly evident in Maryland, where the district percentages of teachers with one to five years of experience are between 5 and 8 percentage points below the state average (Figure 3.5). This trend may reflect the ability of high-achieving districts to attract and retain mid-career and late-career teachers to work in their district. However, it is also important to note that in all but one of the states profiled (excluding Massachusetts), the overall percentage of teachers in the most novice experience group is much higher than the national average of 9 percent of teachers with fewer than three years of teaching experience (Figure 3.1).
### Delaware

#### Figure 3.2: Delaware Comparison Districts

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>LOCALE</th>
<th>ENROLLMENT</th>
<th>FTE TEACHERS</th>
<th>% PROFICIENT (SBAC 2015)</th>
<th>Grade 4 Math</th>
<th>Grade 4 ELA</th>
<th>Grade 8 Math</th>
<th>Grade 8 ELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caesar Rodney School District</td>
<td>Suburban</td>
<td>7,606</td>
<td>500</td>
<td>62.8%</td>
<td>69.9%</td>
<td>44.7%</td>
<td>63.2%</td>
<td></td>
</tr>
<tr>
<td>Brandywine School District</td>
<td>Suburban</td>
<td>10,799</td>
<td>744</td>
<td>50.9%</td>
<td>54.0%</td>
<td>35.0%</td>
<td>52.0%</td>
<td></td>
</tr>
<tr>
<td>Cape Henlopen School District</td>
<td>Urban</td>
<td>5,034</td>
<td>379</td>
<td>63.3%</td>
<td>65.1%</td>
<td>57.1%</td>
<td>66.0%</td>
<td></td>
</tr>
<tr>
<td>Delmar School District</td>
<td>Rural</td>
<td>1,329</td>
<td>76</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>45.2%</td>
<td>56.8%</td>
</tr>
<tr>
<td>State Average</td>
<td>--</td>
<td>131,514</td>
<td>8,947</td>
<td>38.0%</td>
<td>46.1%</td>
<td>35.4%</td>
<td>47.2%</td>
<td></td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics, Delaware Department of Education

#### Figure 3.3: Delaware – Teacher Experience Levels in High-Achieving Districts

- Caesar Rodney (suburban)
- Brandywine (suburban)
- Cape Henlopen (rural)
- Delmar (rural)
- State Average

Source: Delaware Department of Education

---

90 Experience level data from the 2013-14 school year. “Number of Full-Time Teachers by Years of Experience 2013-14.” Delaware Department of Education. http://dedoe.schoolwires.net/Page/1490
MARYLAND

Figure 3.4: Maryland Comparison Districts

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>LOCALE</th>
<th>ENROLLMENT</th>
<th>FTE TEACHERS</th>
<th>% PROFICIENT (PARCC 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grade 4 Math</td>
</tr>
<tr>
<td>Montgomery County Public Schools</td>
<td>Suburban</td>
<td>151,295</td>
<td>10,541</td>
<td>38.4%</td>
</tr>
<tr>
<td>Howard County Public Schools</td>
<td>Suburban</td>
<td>52,806</td>
<td>4,148</td>
<td>49.8%</td>
</tr>
<tr>
<td>St. Mary’s County Public Schools</td>
<td>Rural</td>
<td>17,841</td>
<td>1,061</td>
<td>37.4%</td>
</tr>
<tr>
<td>Queen Anne’s County Public Schools</td>
<td>Rural</td>
<td>7,716</td>
<td>518</td>
<td>39.3%</td>
</tr>
<tr>
<td>State Average</td>
<td>--</td>
<td>843,724</td>
<td>60,053</td>
<td>30.6%</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics, Maryland Department of Education

Figure 3.5: Maryland – Teacher Experience in High-Achieving Districts

Source: Maryland Department of Education

[2] Proficiency on the PARCC exam refers to the percent of students who met expectations (Level 4) or exceeded expectations (Level 5). Note that in some districts, the percentage for students at Level 5 was listed as “less than 5 percent;” in those cases, this figure reflects a percentage of five percent. “2015 Maryland Report Card.” Maryland Department of Education. http://reportcard.msde.maryland.gov/rcounty.aspx?WDATA=Local+School+System
Figure 3.6: Massachusetts Comparison Districts

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>LOCALE</th>
<th>ENROLLMENT</th>
<th>FTE TEACHERS</th>
<th>% PROFICIENT (PARCC 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grade 4 Math</td>
<td>Grade 4 ELA</td>
</tr>
<tr>
<td>Newton School District</td>
<td>Suburban</td>
<td>12,601</td>
<td>2,141.0</td>
<td>72%</td>
</tr>
<tr>
<td>Shrewsbury School District</td>
<td>Suburban</td>
<td>6,011</td>
<td>782.8</td>
<td>79%</td>
</tr>
<tr>
<td>Richmond School District</td>
<td>Rural</td>
<td>150</td>
<td>29.0</td>
<td>92%</td>
</tr>
<tr>
<td>Douglas School District</td>
<td>Rural</td>
<td>1,596</td>
<td>185.4</td>
<td>54%</td>
</tr>
<tr>
<td>State Average</td>
<td>--</td>
<td>955,739</td>
<td>128,751.3</td>
<td>55%</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics, Massachusetts Department of Elementary and Secondary Education

Figure 3.7: Massachusetts – Teacher Experience (by Age) in High-Achieving Districts

Source: Massachusetts Department of Elementary and Secondary Education


[2] Proficiency on the PARCC exam refers to the percent of students who met expectations (Level 4) or exceeded expectations (Level 5). “2015 Partnership for Assessment of Readiness for College and Careers (PARCC) Results.” Massachusetts Department of Elementary and Secondary Education. http://www.doe.mass.edu/parcc/results.html

### NORTH CAROLINA

#### Figure 3.8: North Carolina Comparison Districts

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>LOCALE</th>
<th>ENROLLMENT</th>
<th>FTE TEACHERS</th>
<th>% PROFICIENT (EOG EXAMS 2013)</th>
<th>Grade 4 Math</th>
<th>Grade 4 ELA</th>
<th>Grade 8 Math</th>
<th>Grade 8 ELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hanover County Public Schools</td>
<td>Urban</td>
<td>25,398</td>
<td>1,716.70</td>
<td>55.9% 52.5% 44.2% 46.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapel-Hill-Carrboro City Schools</td>
<td>Suburban</td>
<td>12,166</td>
<td>937.3</td>
<td>69.7% 67.1% 60.4% 67.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wake County Public Schools</td>
<td>Suburban</td>
<td>153,534</td>
<td>9,868</td>
<td>59.2% 53.9% 42.0% 50.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alexander County Public Schools</td>
<td>Rural</td>
<td>5,290</td>
<td>340</td>
<td>53.6% 49.4% 26.9% 32.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union County Public Schools</td>
<td>Rural</td>
<td>41,074</td>
<td>2,560</td>
<td>64.8% 56.7% 55.5% 56.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stokes County Public Schools</td>
<td>Rural</td>
<td>6,486</td>
<td>471.3</td>
<td>47.0% 41.4% 32.3% 45.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Average</td>
<td>--</td>
<td>1,459,852</td>
<td>99,573</td>
<td>47.6% 43.7% 34.2% 41.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics, North Carolina Department of Public Instruction

#### Figure 3.9: North Carolina – Teacher Experience in High-Achieving Districts

![Teacher Experience in High-Achieving Districts](image)

Source: North Carolina Department of Public Instruction

---


94 Data from the 2012-13 school year. The NC DOE district report cards present teacher experience levels for elementary, middle, and high schools separately; this figure presents the average percent of the three grade spans for each experience range. “North Carolina School Report Cards,” Op. cit.
PROJECT EVALUATION FORM

Hanover Research is committed to providing a work product that meets or exceeds client expectations. In keeping with that goal, we would like to hear your opinions regarding our reports. Feedback is critically important and serves as the strongest mechanism by which we tailor our research to your organization. When you have had a chance to evaluate this report, please take a moment to fill out the following questionnaire.


CAVEAT

The publisher and authors have used their best efforts in preparing this brief. The publisher and authors make no representations or warranties with respect to the accuracy or completeness of the contents of this brief and specifically disclaim any implied warranties of fitness for a particular purpose. There are no warranties that extend beyond the descriptions contained in this paragraph. No warranty may be created or extended by representatives of Hanover Research or its marketing materials. The accuracy and completeness of the information provided herein and the opinions stated herein are not guaranteed or warranted to produce any particular results, and the advice and strategies contained herein may not be suitable for every client. Neither the publisher nor the authors shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages. Moreover, Hanover Research is not engaged in rendering legal, accounting, or other professional services. Clients requiring such services are advised to consult an appropriate professional.