



CONSORTIUM FOR POLICY RESEARCH IN EDUCATION

Seven Trends: The Transformation of the Teaching Force

Updated April 2014

CPRE REPORT

Richard Ingersoll
Lisa Merrill
Daniel Stuckey

About Consortium for Policy Research in Education (CPRE)

The Consortium for Policy Research in Education (CPRE) brings together education experts from renowned research institutions to contribute new knowledge that informs K-16 education policy and practice. Our work is available for free to education policymakers, practitioners, and researchers at cpre.org.

CPRE's member institutions are the University of Pennsylvania; Teachers College, Columbia University; Harvard University; Stanford University; University of Michigan; University of Wisconsin-Madison; and Northwestern University.



Suggested citation:

Ingersoll, R., Merrill, L., & Stuckey, D. (2014). *Seven trends: the transformation of the teaching force, updated April 2014*. CPRE Report (#RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

RICHARD M. INGERSOLL is a senior researcher at the Consortium for Policy Research in Education (CPRE) and a professor of education and sociology at the University of Pennsylvania, Graduate School of Education. Dr. Ingersoll's research on teaching and teachers has been nationally recognized. He can be reached at rmi@gse.upenn.edu.

LISA MERRILL is a Research Associate at the Research Alliance for New York City Schools and a post-doctoral researcher at the Consortium for Policy Research in Education (CPRE). Dr. Merrill is a recent graduate of the University of Pennsylvania, Graduate School of Education, where she studied education policy. She can be reached at emerrill@gse.upenn.edu.

DANIEL STUCKEY is a doctoral student in the Education Policy Program of the University of Pennsylvania, Graduate School of Education.

This report draws from a preliminary article published in *Educational Leadership* in May 2010 (Ingersoll & Merrill 2010). Support for some of the preliminary work on this project done in 2009-10 came from a grant from the National Commission on Teaching and America's Future, funded by the Gates Foundation. Opinions in this paper reflect those of the authors and do not necessarily reflect those of the granting agency. Jon Supovitz provided valuable feedback on the paper. Henry May and David Perda provided valuable assistance with the earlier data analyses.





Table of Contents

1	Introduction
2	Trend 1: Larger
8	Trend 2: Grayer
11	Trend 3: Greener
14	Trend 4: More Female
17	Trend 5: More Diverse, by Race-ethnicity
19	Trend 6: Consistent in Academic Ability
22	Trend 7: Less Stable
27	Conclusion
29	References



Introduction

Has the elementary and secondary teaching force changed in recent years? And, if so, how? Have the types and kinds of individuals going into teaching changed? Have the demographic characteristics of those working in classrooms altered? To answer these questions we embarked on an exploratory research project to try to discover what trends and changes have, or have not, occurred in the teaching force over the past few decades. We were surprised by what we found. We discovered that the teaching force has been, and is, greatly changing; yet, even the most dramatic trends appear to have been little noticed by researchers, policy makers, and the public.

To explore these questions, we used the largest and most comprehensive source of data on teachers available—the Schools and Staffing Survey (SASS) and its supplement, the Teacher Follow-Up Survey (TFS). These data are collected by the National Center for Education Statistics (NCES), the statistical arm of the U.S. Department of Education (for information on SASS, see NCES, 2005). NCES has administered seven cycles of SASS over a 25-year period—1987-88, 1990-91, 1993-94, 1999-2000, 2003-04, 2007-08, and 2011-12. In each cycle, NCES administers questionnaires to a nationally representative sample of about 50,000 teachers, 11,000 school-level administrators, and 5,000 district-level officials, collecting an unusually rich array of information on teachers, their students, and their schools. We decided to take advantage of both the depth and duration of these data to explore what changes have taken place in the teaching force and teaching occupation over the two and a half decades from 1987 to 2012. Below, we summarize seven of the most prominent trends and changes; we found the teaching force to be:

1. Larger
2. Grayer
3. Greener
4. More Female
5. More Diverse, by Race-ethnicity
6. Consistent in Academic Ability
7. Less Stable

For each of the trends, two large questions arise:

1. Why? What are the reasons for and sources of the trend?
2. So what? What difference does it make? What are the implications and consequences of the trend?

We will offer some possible answers to these questions. But our intent here is not to try to arrive at closure; that would require far more extensive analyses. Our work here is largely exploratory and suggestive, rather than explanatory and evaluative. In short, we ask more questions than we are able to answer. We plan to soon undertake further research to rectify that.

In the initial edition of this report, released in November 2012, our analyses went up to 2008—the most current data then available. With the recent release of the 2011-12 SASS data, we have been able to update almost all of our findings for this new edition of our report.

Trend 1: Larger

The teaching force has ballooned in size. The Census Bureau indicates that PreK-12 teachers form the largest occupational group in the nation (Bureau of Labor Statistics, 2011), and it is growing even larger. Growth in the numbers of students and teachers is not new. The numbers of both students and teachers grew throughout the 20th century, and the rate of growth for both groups began to soar in the late 1940s with the post-World War II baby boom and the emergence of the comprehensive high school. Student enrollment peaked by 1970 and then declined until the mid-1980s. During this period the numbers of teachers also peaked, and then leveled off. In the mid-1980s, elementary and secondary student enrollment again began to grow. Since then, the teaching force has also been increasing in size (see Figure 1).

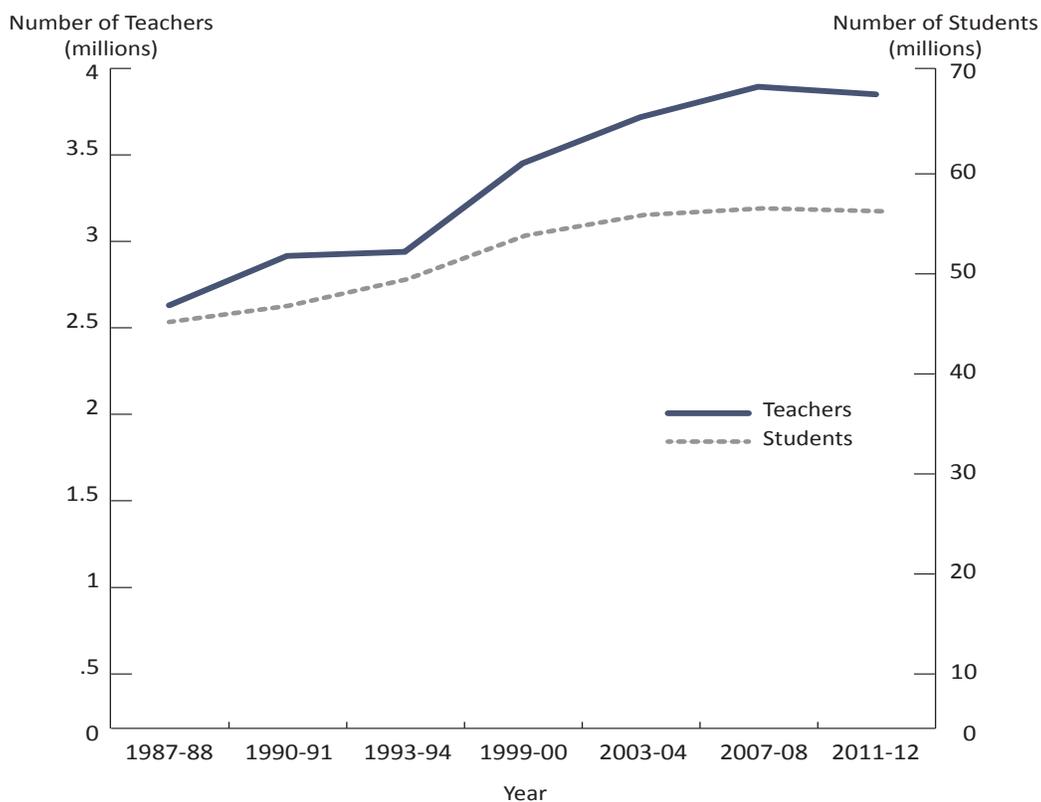
The rate of these increases has not matched those of the baby boom years—with one large difference. In recent decades, the rate of increase for teachers has far outpaced the rate of increase for students—that is, the number of teachers has been going up far faster than is the number of students. As the top of Figure 2 shows, from 1987 to 2012 total K-12 student enrollment in the nation's schools (public, private, and charter combined) went up by 19.4 percent. During the same period the teaching force employed in schools increased at over two times that rate, by 46.4 percent. This resulted in a sharp decrease in the overall pupil-teacher ratio in schools.

This ballooning all took place by 2008. Since the economic downturn that began in 2007-08, growth in the teaching force has leveled off. Between 2007-08 and 2011-12, while the student population slightly increased (by less than 1 percent), the teaching force slightly decreased (by about 1 percent). It is unclear how much of this decrease in teachers is due to layoffs or to hiring freezes combined with attrition.

What accounts for the ballooning of the teaching force between the late 1980s and 2008?

Interestingly, the number of teachers employed in private schools has increased at a faster rate than in public schools (Figure 2). But, surprisingly, while the total number of teachers in private schools has increased, the number of students has *decreased*. This also varied by type of private school. The two decades from 1987 to 2008 saw a 21 percent increase in the number of teachers employed in Catholic schools, while there was a 22 percent decrease in both the number of Catholic schools and in the total number of students enrolled in them. On the other hand, there were large increases in the total number of schools, students, and teachers in the non-Catholic religious private school sector and in the non-sectarian private school sector. The overall result has been a sharp decrease in the average pupil-teacher ratio and average class sizes in private schools, which were already lower than in public schools. However, this increase in private sector teachers and reduction in the student-to-teacher load in private schools does not account for much of the overall ballooning because private schools only account for a small portion of the student population (about 8.3 percent) and of the teaching force (about 12 percent).

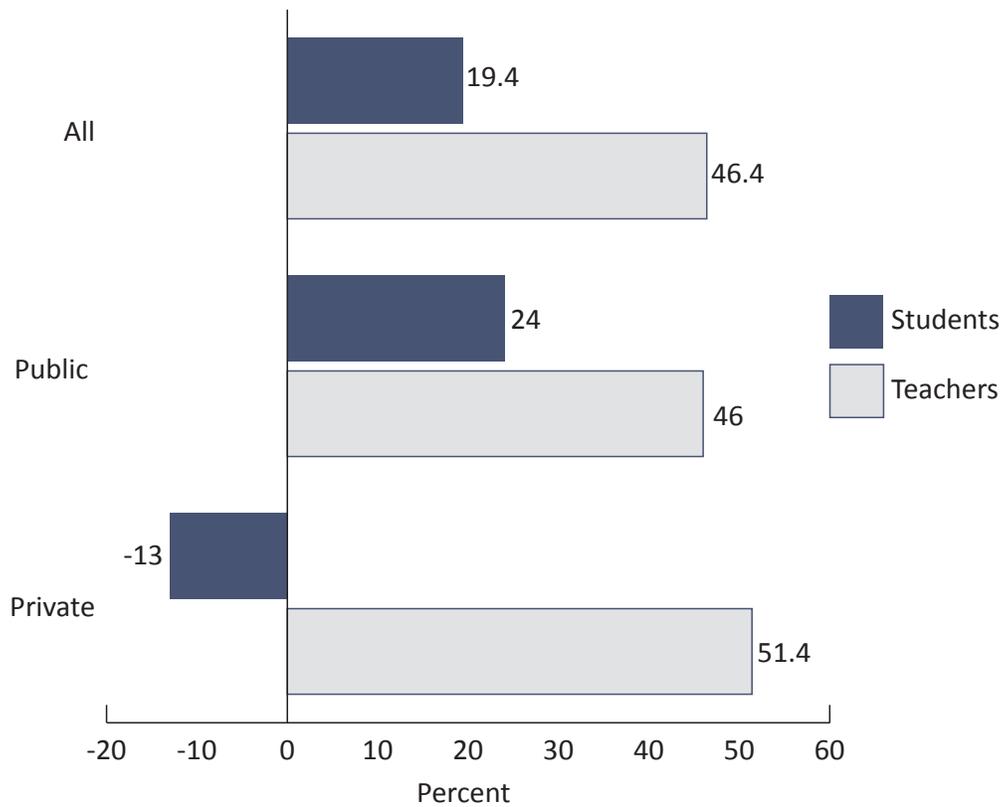
Figure 1: Number of Elementary and Secondary School Teachers and Students, 1987-88 to 2011-12



Charter schools have dramatically grown in number over the past couple of decades, but they account for even less of the ballooning of the teaching force than do private schools because they represent a tiny segment of schools (about 4 percent) and of the teaching force (about 3 percent).

Another possible explanation for the ballooning is that a reduction in public school teachers' workloads—class sizes, hours worked, or classes taught per day—has necessitated an increase in the number of teachers employed. For instance, some states, such as California, implemented class size reduction reforms to great fanfare—leading to a demand for more teachers.

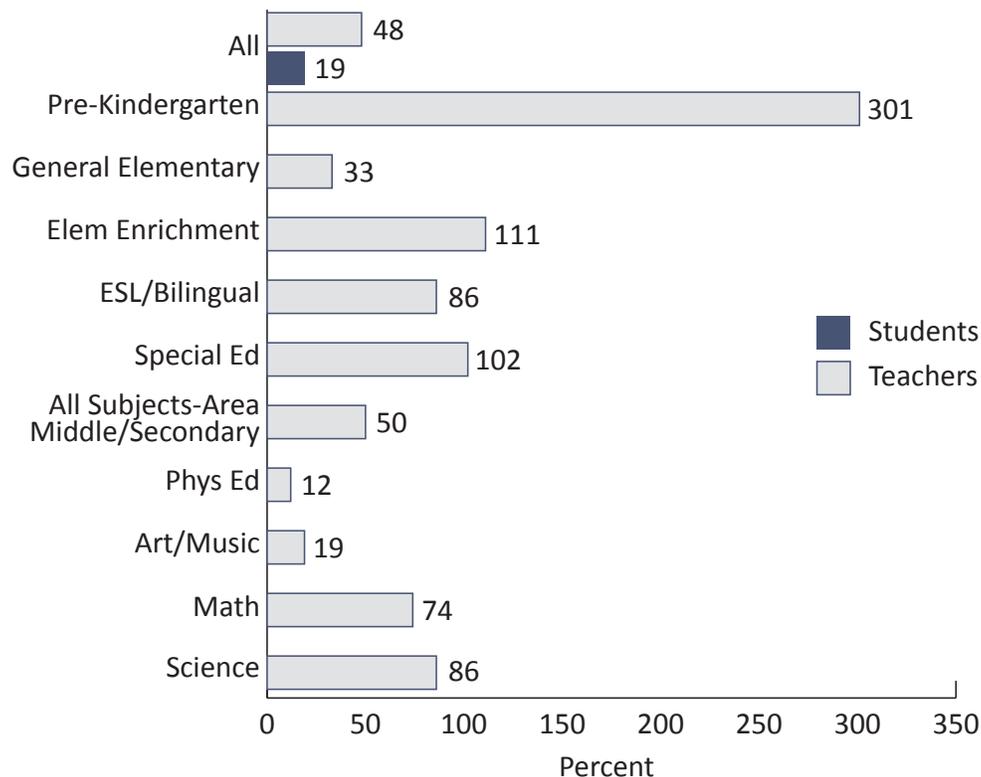
Figure 2. Percent Change in Students and Teachers, by School Type, from 1987-88 to 2011-12



On close examination, this explanation does account for part of the ballooning of teachers, but not as much as one might expect. Public school elementary-level class size did decrease by 20 percent during this period (late 1980s to 2008), from an average of 26.2 to 21.1 students per general elementary school classroom. Accordingly, the number of general elementary school teachers increased, and because elementary teachers comprise almost a third of the teaching force, their increase accounts for about 21 percent of the total increase in the teaching force.

However, in contrast to elementary classrooms, typical subject-area courses at public middle and secondary schools experienced little change in class size during this period. Indeed, there was a slight increase in the workload of subject-area teachers at the middle and secondary school levels—the number of class periods that teachers taught per day increased. And, at all grade levels, the average number of instructional hours that teachers work per week slightly increased.

Figure 3. Percent Increase in Students and Teachers, by Field from 1987-88 to 2007-08



As shown in Figure 3, which focuses on the 1987-88 to 2007-08 period, there have been dramatic increases in the number of pre-kindergarten teachers, bilingual/English-as-a-Second-Language teachers, and those teaching elementary enrichment classes (these are instructors who teach only one subject, such as art, music, physical education, computer science, or mathematics, to most of the students in a given elementary school). It is important to also note that these data on relative increases of fields do not take into account the relative size of fields and can be misinterpreted if a large increase occurs in a small field, or vice versa. In the case of these three types of teachers, while each is undergoing dramatic growth, combined they remain a small segment of the teaching force, and hence, their rapid increases together account for only 5 percent of the overall increase in teachers during this two-decade period.

The data indicate that a far more significant source of the ballooning has been the growth of special education, no doubt linked to changes in the Individuals with Disabilities Education Act, the main federal special education legislation. As Figure 3 shows, the number of teachers with college majors in special education increased by 102 percent, compared to 33 percent for general elementary school teachers. Special education classes average about half the size of typical classes in elementary and secondary schools. The increase in special education teachers alone accounts for almost as much of the entire increase in the teaching force as does that of elementary teachers.

As the teaching force has grown, it has also experienced large shifts at the middle and secondary levels during this period. Overall, the number of typical subject-area teachers at the middle and secondary school level has increased by 50 percent. But there has also been a large redistribution of these teachers across fields, with winners and losers. Among the losers are art, music, and physical education. Among the winners, besides special education, are mathematics and science. The number of teachers with mathematics or mathematics education degrees went up by 74 percent from the late 1980s to 2008. The number of teachers with degrees in one of the sciences or in science education went up by 86 percent. Although there are two and a half times as many general elementary teachers as mathematics and science teachers, the increase in math and science teachers accounts for almost 15 percent of the overall ballooning. Interestingly, the data also show that the fastest rate of increase among mathematics and science teachers occurred during the 1990s, before the advent of the No Child Left Behind Act.

A major factor in the growth of mathematics and science teachers appears to be changes in high school graduation requirements across the nation. Graduation requirements for core subjects, especially mathematics and science, increased during this period. This change meant that students took more mathematics and science courses. The data show that the number of students enrolled in mathematics and science classes went up by 69 percent and 60 percent, respectively, in turn driving the large increase in the employment of teachers qualified in those subjects during this period.

However, we have not yet uncovered all of the sources and factors behind the ballooning of the teaching force. The relatively large increases in three areas mentioned above—special education, elementary education, and math/science—accounted for only about half of the total ballooning of the teaching force during those two decades. Another possible set of factors behind the ballooning, which we plan to investigate, could be ongoing increases in the number and range of programs and curricula that schools are required to offer, especially at the secondary level. Educational historians tell us that programmatic expansion has been going on for a century, as schools have continually been asked to take on more and more goals and tasks that were once the responsibility of parents, families, and communities, and as our school system is continually asked to address larger problems of our society and economy (Kirst, 1984).

Given the broad implications, there are good reasons to investigate the sources of the rapid growth in the teaching force. One sobering implication is the cost of this expansion of the teaching force, since teacher salaries are the largest item in school district budgets. How much has ballooning cost the nation for teacher salaries? How have school systems been able to cope with such an increase in their largest budget item, and who pays for it? To explore these issues, we are undertaking a separate study to ascertain the increase in aggregate salaries for teachers across the nation due to the ballooning in the number of teachers between 1987-88 and 2011-12.

Another implication of the ballooning is for the much-heralded mathematics and science teacher shortage. We have explored this issue in depth elsewhere (see Ingersoll & Perda, 2010; Ingersoll, 2011). Among other findings, our data analyses show that, contrary to conventional wisdom, the growth in the new supply and employment of qualified mathematics and science teachers has not only more than kept pace with increases in mathematics and science student enrollments, but also with mathematics and science teacher retirement increases—a point we address in Trend 2.

Our data analyses also reveal some common misunderstandings by commentators on differing sides of the ideological and political spectrum. For instance, some liberal-left commentators, such as Nobel Laureate economist Paul Krugman, have argued that the recent economic recession could be kick-started into recovery if those teachers who were laid off during the past several years were simply rehired (Krugman, 2012). However, this view overlooks the prior ballooning of the teaching force. Our data show that the decline in the teaching force since 2007-08, when the economic downturn began, has been very small compared to the dramatic ballooning the teaching force experienced in the preceding decades. Our data show the teaching force increased by about 1.3 million from 1987-88 to 2007-08, but only declined by about 45,000 teachers between 2007-08 and 2011-12. In other words, put into a historical context, reductions of the teaching force are neither large, nor severe. Of course, the key question is whether the ballooning will pick up again as the economy improves.

On the other side of the political spectrum, some free-market and conservative economists and organizations, such as the Milton Friedman Foundation for Educational Choice, have specifically focused on the ballooning of the teaching force, which they interpret as an example of “bureaucratic bloat” and “negative productivity” in the public sector (e.g., Moore, 2011; Scafidi, 2013). This view cites the ballooning as evidence for a reduction in teacher productivity—more teachers per students coupled with little change in test scores. The solution this view typically espouses is school choice and privatization, based on the argument that leaner private schools (and charter schools) are more efficient. Private schools, in this view, have fewer administrators, reward excellent teaching, fire low-performing teachers, improve student achievement and, in turn, achieve greater teacher productivity—in other words, they get greater achievement with fewer teachers.

However, some national data appear to undercut this conservative argument. It is true that the data on student achievement have long shown that, overall, students in private schools score higher on math and reading scores. But the data on gains and growth in student achievement in recent decades are mixed. Data from the National Assessment of Educational Progress (NAEP), for example, show little or no gain in reading scores of 13- and 17-year olds attending either public or private schools between the late 1980s and 2008, when the ballooning occurred. On the other hand, the data show statistically significant gains in 9-year olds' reading scores and in both 9- and 13-year olds' math scores during this period. Notably, these gains were similar in both public and private schools (U.S. Department of Education, 2009).

But, crucially, what the previously mentioned critics overlook is the larger ballooning of the teacher force in private schools. Private schools have long had lower pupil-teacher ratios and lower average class sizes than public schools, but as we show in Figure 2, this gap between public and private schools has dramatically grown in recent decades. Indeed, not only has the teaching force grown faster in private schools than in public schools since the late 1980s, this has happened while the overall number of students in private schools has *decreased*. In essence, the data show that the very criticism of bloating and inefficiency that many conservative critics levy at public schools is perhaps more aptly directed at private schools, where teacher ballooning has outpaced that in the public schools but where productivity increases do not appear to have done so.

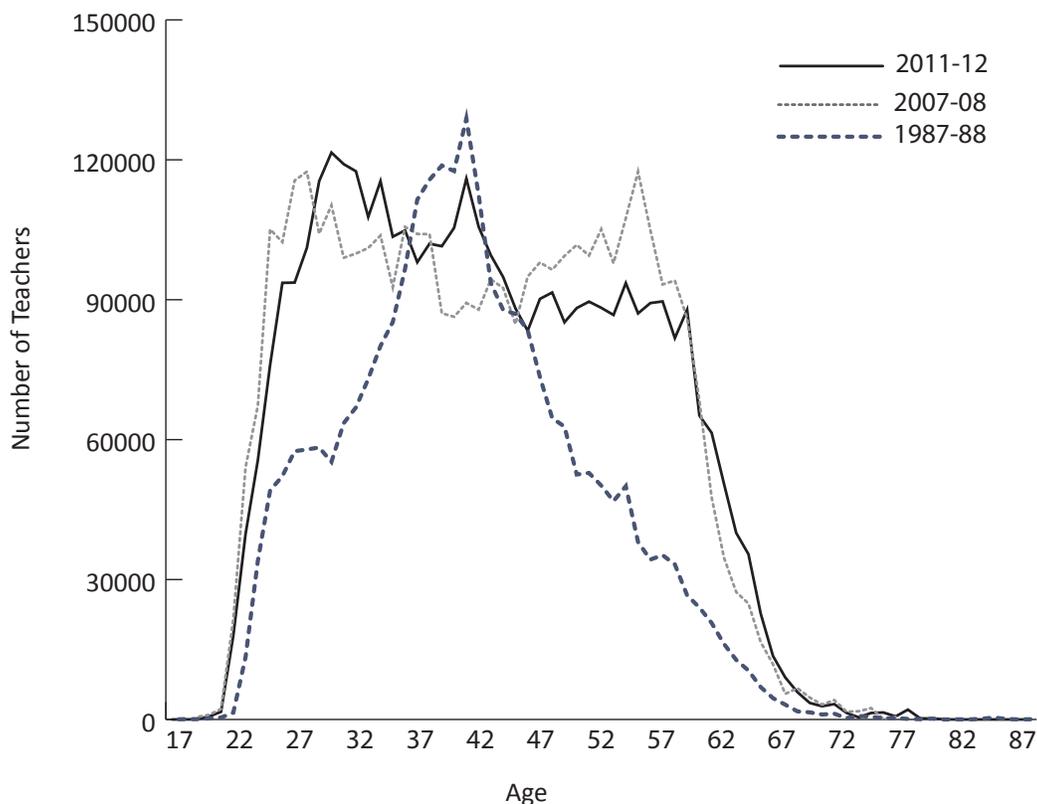
The ballooning of the teaching force is a dramatic trend, and it is no surprise that a variety of commentators have begun to notice and offer explanations for it. However, the reasons for, and implications of, this dramatic growth are still unclear. We hope to address the questions with further research.

Trend 2: Grayer

The teaching force has been getting older. We have often heard about this trend because of its link to teacher shortages. Since the mid 1980s, numerous highly publicized reports have warned of a coming educational crisis caused by severe teacher shortages in elementary and secondary schools (e.g., National Commission on Excellence in Education, 1983; National Academy of Sciences, 1987; National Commission on Teaching and America's Future, 1996, 1997). These reports predicted a dramatic increase in the demand for new teachers, primarily as a result of two converging demographic trends—increasing student enrollments and increasing teacher retirements due to a “graying” teaching force. Shortfalls of teachers, the argument surmised, would force many school systems to resort to lowering standards to fill teaching openings, inevitably resulting in high numbers of under-qualified teachers and low school performance. In recent years, high-profile reports from organizations such as the John Glenn Commission on Mathematics and Science Teaching for the 21st Century (2000), the National Research Council

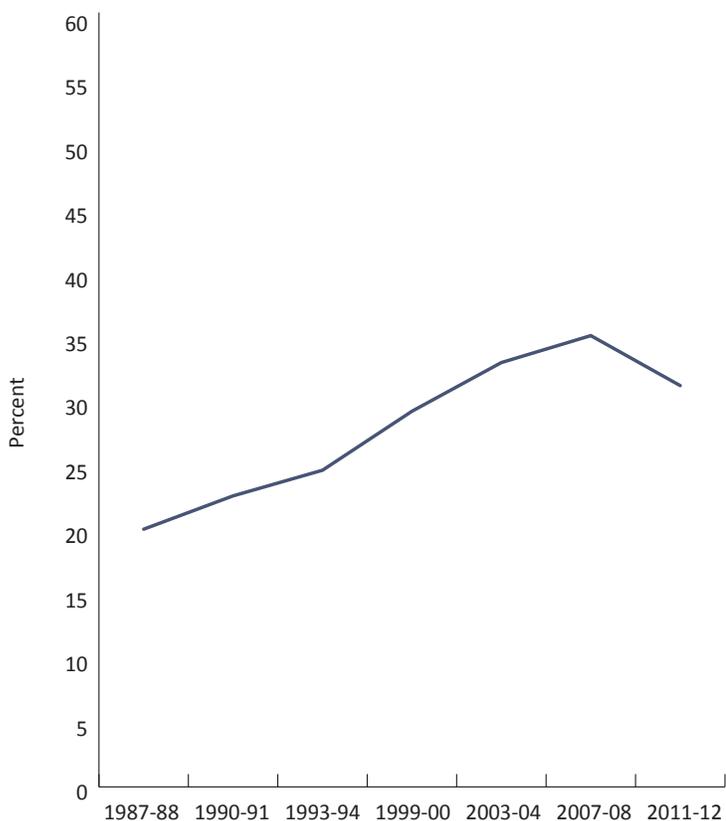
(2002), and the National Academy of Sciences (2007) have directly tied teacher shortages, especially in mathematics and science, to a host of educational and societal problems: from the inability to meet student achievement goals, to low U.S. educational performance compared to other nations, to the minority achievement gap, to national economic competitiveness, and even to the security of the nation.

Figure 4. Age of School Teachers, 1987, 2007, and 2011



Our data confirm this demographic trend—the teaching force has gotten older, and teacher retirements have steadily increased. But our analyses also show that this trend is largely over, and the continuing stream of reports with dire warnings of an aging teaching force are simply repeating an old story that is no longer true. As Figure 4 shows, in 1987-88 the age distribution of school teachers was shaped like a tall peak. The modal, or most common, age was 41. As the years went by this group continued to age, and as Figure 4 also shows, by 2007-08 the modal age of the teaching force was 55. However, by 2011-12 the modal age of the teaching force had decreased to 30. Likewise, the number of teachers 50 years or older increased, from about 530,000 in 1988 to 1.3 million in 2008, but by 2011-12 had decreased to about 1.2 million—a drop of about 170,000 teachers (see Figure 5 for percentage changes). As a result, the number of teacher retirements has similarly changed, from 35,000 in 1988-89, to 87,000 in 2004-05, to 85,000 in 2008-09.

Figure 5. Percent School Teachers Age 50 and Over, 1987-88 to 2011-12



What are the implications of this trend?

The aging of the teaching force has had large cost implications for both school budgets and for state pension systems—an issue that has received much media and policy attention in recent decades. Veteran teachers earn higher salaries, which, in turn, can strain school and district budgets. Increases in the number of retirees mean larger outlays from state pension plans. But in discussions of the dire future for pension systems, another factor has been overlooked; if schools replace retirees with new teachers, who earn lower salaries, and who also pay into state pension plans, these additional costs could be lessened. As we discuss in Trend 3, not only have retirees been replaced with newcomers, but the flow of newcomers has become a flood.

Another implication of aging is its impact on the supply of teachers. Conventional wisdom has long held that retirements are a major factor behind teacher shortages. But teacher retirements have always represented only a small portion of all of those leaving teaching—less than a third in recent years. And, if you look at all departures of teachers from schools (both those moving between schools and those leaving teaching altogether), retirement is only about 14 percent

of the total outflow. In our research on the math and science teacher shortage, as mentioned above, we have found that, contrary to the conventional wisdom, the new supply of qualified math and science teachers has been more than sufficient to cover student enrollment increases and teacher retirement increases in mathematics and science. In contrast, the main, but under-recognized source of mathematics and science teacher staffing problems is pre-retirement voluntary turnover (see Ingersoll, 2011; Ingersoll & Perda, 2010), an issue to which we return in Trend 7.

Trend 3: Greener

Graying is not the only change in the age and experience of the teaching force. Another opposite and unrecognized trend has occurred simultaneously. As Figure 4 shows, by 2008, the teacher age distribution had become almost bi-modal, with two peaks. As the proportion of older, veteran teachers increased, so has the proportion of beginning teachers. The increase in beginning teachers is largely driven by the ballooning trend, that is, by the huge increase in new hires.

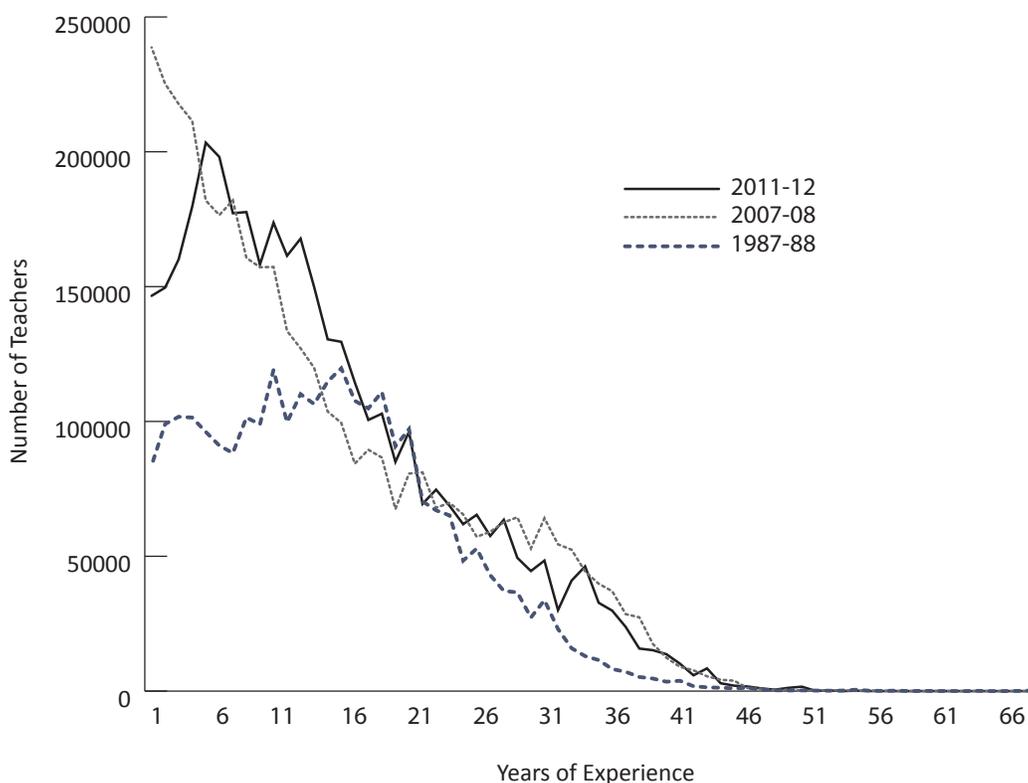
Most of these new hires are young, recent college graduates; however, a significant number are older but inexperienced beginning teachers. For instance, in 2011-12 almost a third of the new hires were age 29 or older, and a tenth were over 40—the phenomenon often referred to as mid-career switching. Parallel to the general ballooning, between the late 1980s and 2008-09, there was also an increase in the number of older new hires. But, mid-career switching into teaching is neither new, nor an upward trend. Indeed despite such recruitment programs as Troops to Teachers, the proportion of new hires that were age 29 or older decreased from 43 percent in the late 1980s to 30 percent in 2011-12.

Regardless of their age, these many new hires have resulted in a third trend—a dramatic increase in the number of teachers who are beginners—which we have labeled the greening of the teaching force. This trend is illustrated by the distribution of teachers by their years of teaching experience. In 1987-88, the modal, or most common, school teacher had 15 years of teaching experience under his or her belt, and the shape of the distribution was a single peak, as shown in Figure 6. By 2007-08, as Figure 6 also shows, the modal teacher was not a gray-haired veteran; he or she was a beginner in his or her first year of teaching. With the advent of the economic downturn beginning in 2007-08 and the subsequent decrease in hiring, which was accompanied by layoffs—usually of beginners—this greening of the teaching force slowed down. By 2011-12, the modal teacher was someone in his or her fifth year (Figure 6).

Despite the slowing of this trend, the teaching force remains very green. There are, of course, still large numbers of veteran teachers; in 2011-12 about a quarter of all school teachers had 20 years or more of teaching experience. But these percentages do not take into account the ballooning of the teaching force. Because the teaching force has dramatically grown, *numerically* there are

far more beginners than before. For example, in 1987-88, there were about 84,000 first-year teachers; by 2007-08, there were over 239,000. By 2011-12, despite several years of layoffs and little hiring, there were still 147,000 first-year teachers. Similarly, in 1987-88, approximately 1 million teachers (about 37 percent of all teachers) had 10 or fewer years of teaching experience; in 2007-08, this number had doubled to 1.9 million (about half of the teaching force). By 2011-12 there were still over 1.7 million teachers (about 45 percent of the teaching force) with 10 or fewer years of experience.

Figure 6. Teaching Experience of School Teachers, 1987-88, 2007-08, and 2011-12



What are the implications of this trend?

New teachers can be a source of fresh ideas and energy, and it can be beneficial to have new faculty coming into schools. On the other hand, having an increasingly larger number of beginners, along with an increasingly smaller number of veterans in a school, could also have a negative impact. Being taught by more experienced teachers, for example, can make a positive difference for students' academic achievement. A growing number of empirical studies document what is

common sense among those who have taught—that teachers’ effectiveness at improving their students’ test scores increases significantly through their first several years on the job (e.g., Henry, Fortner, & Bastian, 2012; Kane, Rockoff, & Staiger, 2006). Beyond academic instruction, as they collect more experience, teachers also have more opportunity to develop many other attributes crucial to the teaching job, such as how to deal with student behavior problems, how to teach students with diverse backgrounds and abilities, how to work and communicate with parents, how to best promote good work habits in students, and how to nurture students’ self-esteem. Having sufficient numbers of veteran teachers in a school can also make a positive difference for beginning teachers. A solid body of empirical research documents that support and mentoring by veteran teachers has a positive effect on beginning teachers’ quality of instruction, retention, and capacity to improve their students’ academic achievement (Ingersoll & Strong, 2011).

Greening also has large financial implications—for several reasons. First, greening has implications for overall teacher salary costs. A teaching force with an increasingly large portion of beginners, at the low end of the pay scale, is less expensive, and this could ameliorate some of the increased payroll costs of the ballooning trend mentioned above. In 2011-12, the average starting salary for public school teachers with a college degree and no teaching experience was about \$38,000; while that same year the average highest possible salary for veteran public school teachers, usually with over 15 years experience and a master’s degree, was about \$73,000.

Second, greening has implications for pension systems. First, greening may defray some of the increased pension costs resulting from the graying trend. Economic analysts have been arguing that there has been an alarming decrease in the ratio of new employees who pay into pension systems and Social Security, compared to retired employees who withdraw from pension systems and Social Security. This imbalance does not appear to be the case for teaching, which is the largest occupational group in the nation. As Figures 4 and 6 illustrate, both the proportion and the numbers of younger and less experienced teachers have increased, not decreased.

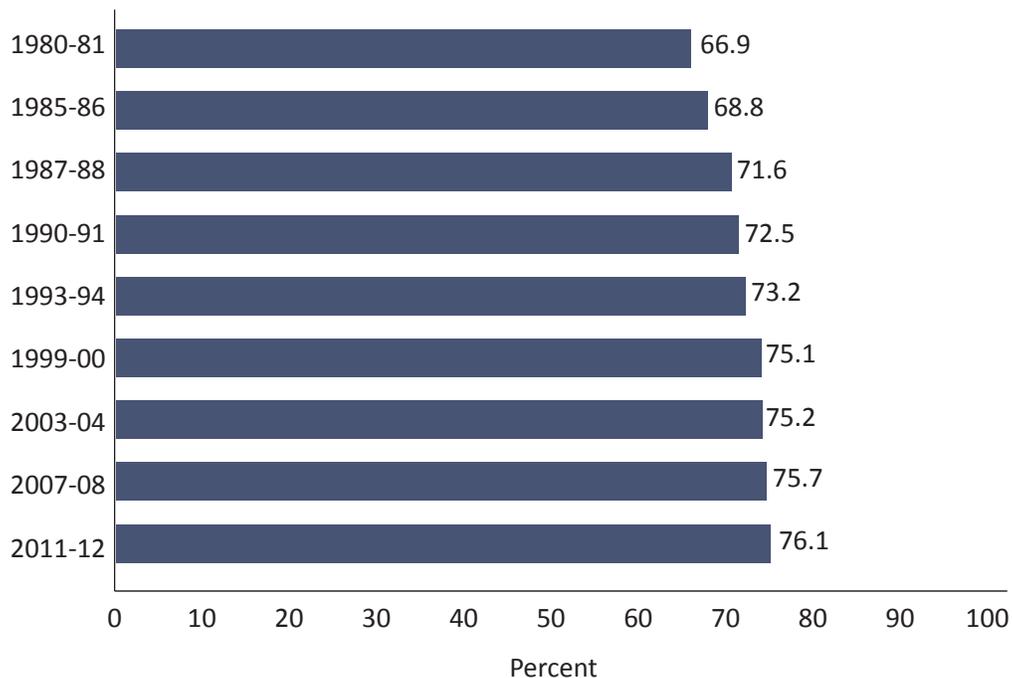
Moreover, as we will show in Trend 7, early attrition has increased among this growing number of beginners, meaning that a decreasing number will ever withdraw funds from their school system’s pension plan. In some states it can take 10 years for a teacher to become fully vested—and hence eligible, upon leaving a school system, to receive any funds contributed by their employers to their pension plan. In addition, school system pension plans are sometimes backloaded—pension payout levels do not increase evenly with each year of increased classroom experience. Rather payouts are often relatively small until a teacher has accumulated two or three decades of classroom experience, after which they suddenly jump. Relatively few teachers remain in such systems long enough to reap these enhanced benefits.

In sum, greening (along with higher attrition) means more of the teaching force is less expensive and more of the teaching force is paying into pension plans, while less of the teaching force will fully, or ever, withdraw from pension systems.

Trend 4: More Female

Historically, school teaching has been a predominantly female occupation. And, in recent decades, the teaching force has become even more female. At first, this finding may seem odd. Over the past several decades, many occupations and professions that traditionally have been predominantly male have opened up to women. For instance, data from the Bureau of Labor Statistics (2011) show that in 1972, only 10 percent of physicians, 4 percent of lawyers, 4 percent of architects, and 13 percent of pharmacists were female; by 2011, these proportions had risen to 34 percent, 32 percent, 14 percent, and 56 percent, respectively.

Figure 7. Percent Female School Teachers, 1980-81 to 2011-12



With career and employment alternatives increasingly available, one might think that fewer women would enter occupations and professions that traditionally have been predominantly female. This has not happened for teaching. Both the number of women entering teaching and the proportion of teachers who are female have gone up. The SASS data, along with other NCES data, show that since the early 1980s there has been a steady increase in the proportion of teachers who are female, from 67 percent in 1980-81 to over 76 percent in 2011-12 (see Figure 7). It is unclear why this has happened.

The change in the male-to-female ratio in teaching is not due to a decline in males entering the occupation. The number of males entering teaching has also grown, by 22 percent, which is also faster than the rate of increase of the student population. But the number of females in teaching has increased at over twice that rate.

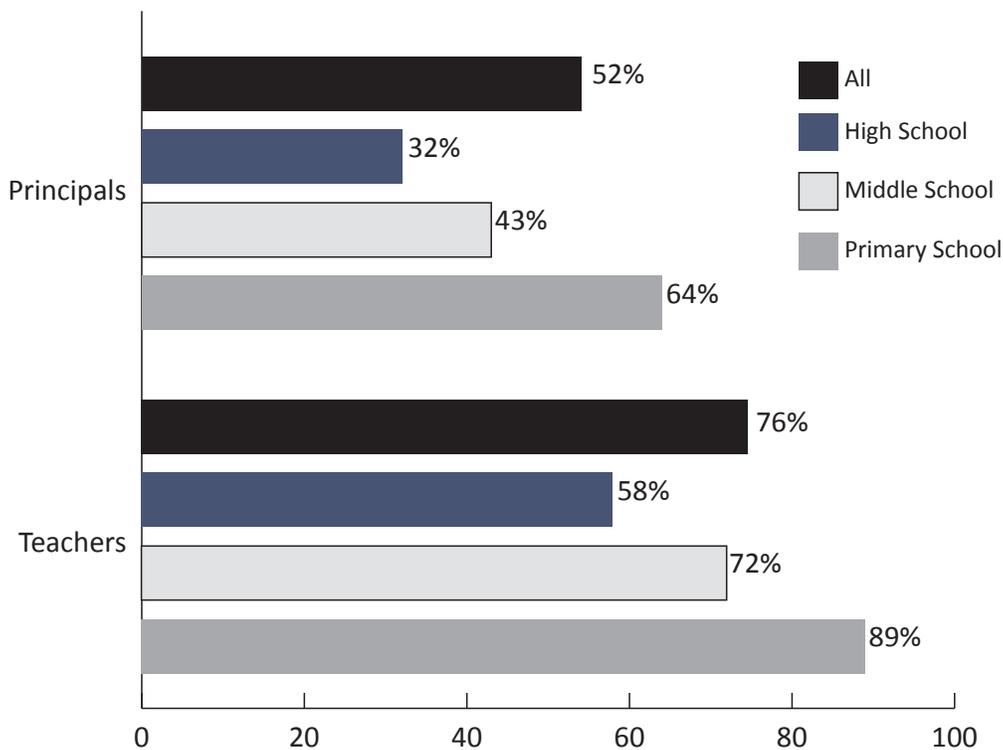
One reason could be a variant of the previously mentioned increasing-career-opportunities hypothesis—females have other employment opportunities in general, but also growing opportunities in the educational sector, both at the secondary level and in leadership. The increase in female teachers is not spread evenly within schools. Increases in the proportion of female teachers have been concentrated at the secondary level, where the majority of teachers were male until the late 1970s. There have been only slight increases at the elementary level, already long predominantly female. There have been even sharper increases in the proportion of female school principals (see Figure 8), over half of whom were female by 2011-12, up from 31 percent in 1987-88. The latter sub-trend, especially, could be a factor in not only the recruitment but also the retention of females, including those of high academic ability—an issue we will turn to in Trend 6. Historians (e.g., Strober & Tyack, 1980; Tyack, 1974) have long held that when the public school system was created in the late 1800s, teaching was intended to be women's work, while educational administration was designed to be men's work. Part of the rationale was that the recruitment and retention of capable males required a career ladder with opportunities for advancement and enhancement in status, pay, and authority. Hence the opening up of educational administration to women—demonstrated by the rapid growth in the numbers of female principals—could be one possible explanation for the continuing attraction of teaching and education careers for women, despite the growth of other employment opportunities.

Another contributing factor might be that the proportion of adult women entering the paid workforce as a whole has dramatically increased. Hence, while women have more job choices than in the past, the large increase overall in women seeking employment may be partly responsible for the large increase in females entering teaching. Data from the Census Bureau's Bureau of Labor Statistics indicate that the number of women employed in the U.S. labor force increased by 29 percent between 1988 and 2012, from about 52 million to 67 million. However, the number of women in K-12 teaching increased by almost twice that rate—by 56 percent—during the same period. The proportion of all employed females who were teachers rose from 3.6 percent to 4.4 percent during the same period. That is, teachings' share of employed women has gone up, not down, during the same time that the number of women dramatically increased in many male-dominated occupations and professions. It appears that the increase in women in teaching is more than simply a result of more women in the workforce.

Yet another factor might have to do with negotiating the dual roles of homemaker and breadwinner—the fit between job and family. Historians argue that one factor behind the high proportion of women in teaching over the past century was the relatively workable fit between the job of teaching and the job of child rearing (Strober & Tyack, 1980). From this viewpoint, with

shortened days and summers off, caring for a family was more manageable for teachers than for women in many other jobs and careers. This workday structure may still be attracting women to teaching.

Figure 8. Percent Female School Teachers and Principals, by School Level, 2011-12



What are the implications of this trend?

If the trend continues, soon 8 of 10 teachers in the nation will be female. An increasing percentage of elementary schools will have no male teachers. An increasing number of students may encounter few, if any, male teachers during their time in either elementary or secondary school. Given the importance of teachers as role models, and even as surrogate parents for some students, certainly some will see this trend as a problem and a policy concern.

Moreover, an increasing proportion of women in teaching may have implications for the stature and status of teaching as an occupation. Traditionally, women's work has been held in lower esteem and has paid less than male-dominated work. If the feminization of teaching continues, what will it mean for the way this line of work is valued and rewarded?

Trend 5: More Diverse, by Race-ethnicity

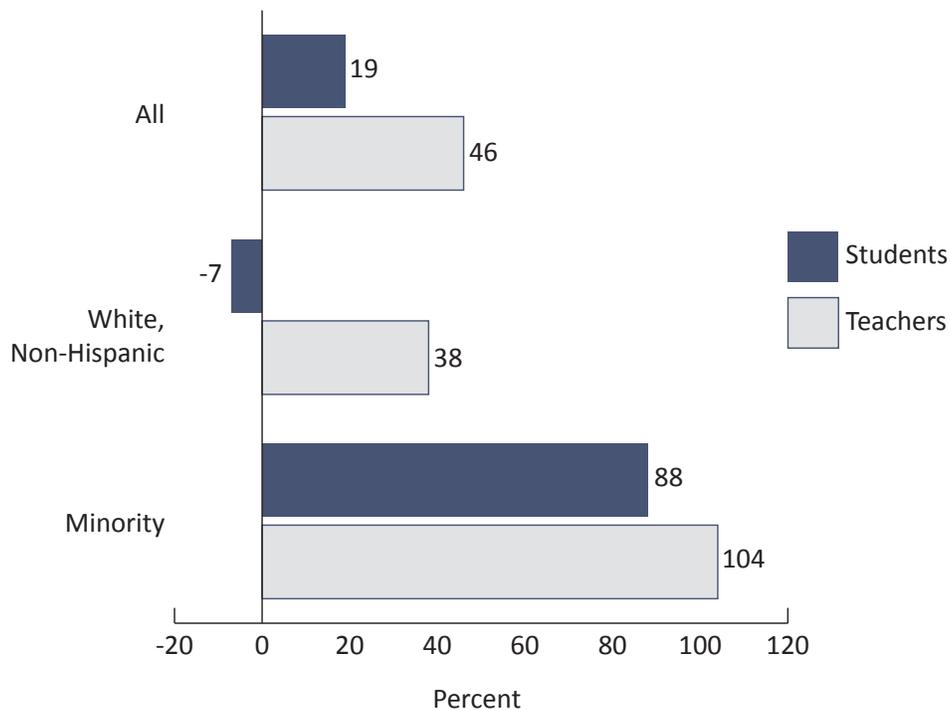
While the teaching force is becoming more homogenous gender-wise, the opposite is true for the race/ethnicity of teachers. At first this finding may also seem odd. For several decades, shortages of minority teachers have been a major issue for the U.S. school system. It is widely held that, as the nation's population and students have grown more diverse, the teaching force has not kept pace. The result, in this view, is that minority students in the nation's schools increasingly lack minority adult role models, lack contact with teachers who understand their racial and cultural background, and often lack access to qualified teachers of any background, because white teachers eschew schools with large percentages of minorities (Irvine, 1988; Ladson-Billings, 1995). The minority teacher shortage, in turn, is widely viewed as a key reason for the minority achievement gap and, ultimately, unequal occupational and life outcomes for minority students (for reviews, see Torres, Santos, Peck, & Cortes, 2004; Villegas & Lucas, 2004; Zumwalt & Craig, 2005). In response, in recent decades numerous government and nongovernment organizations have instituted and funded a variety of minority teacher recruitment programs and initiatives. By 2008, over half of the states had some kind of minority teacher recruitment policies or programs in place.

But this portrait is changing. Our analyses do show that teaching remains a primarily white workforce and that a gap continues to persist between the percentage of minority students and the percentage of minority teachers in the U.S. school system. For instance, in the 2011-12 school year, 37 percent of the nation's population belonged to minority groups, 44 percent of all elementary and secondary students were minority, and only 17.3 percent of all elementary and secondary teachers were minority. But the data also show that this gap is not due to a failure to recruit minority teachers. The gap has persisted in recent years largely because the number of white students has decreased, while the number of minority students has increased. The percent of all teachers who belonged to minority groups increased from 12.4 percent in 1987-88 to 17.3 percent in 2011-12. The likelihood of sampling a minority teacher rose 40 percent between 1987-88 and 2011-12. Moreover, these percentages don't take into account the ballooning of the teaching force. Since the teaching force has dramatically grown, *numerically* there are far more minority teachers than before. In 1987-88, there were about 325,000 minority teachers; by 2011-12, there were over 666,000. Growth in the number of minority teachers outpaced growth in minority students and was over twice the growth rate of white teachers (see Figure 9). So, although the proportion of minority students in schools is still far greater than the proportion of minority teachers, the teaching force has rapidly grown more diverse (for a detailed presentation of our research on this issue, see Ingersoll & May, 2011a, 2011b).

Minority teachers are also overwhelmingly employed in public schools. While commentators and researchers have tended to discuss the minority teacher shortage and the outcome of

minority recruitment efforts in dire and pessimistic terms, the data show that such efforts and expenditures have worked very well. In fact, these efforts have been something of an unheralded victory. Our data show that minority teachers are two to three times more likely than white teachers to work in such hard-to-staff schools serving high-poverty, high-minority, and urban communities. Hence, the data show that in spite of competition from other occupations for minority college graduates, the widespread efforts over recent decades to recruit more minority teachers and place them in schools serving disadvantaged and minority student populations have been very successful.

Figure 9. Percent Change in Students and Teachers, by Race/Ethnicity, 1987-88 to 2011-12



However, while minorities have entered teaching at higher rates than whites in recent decades, the data also show that the rates at which minority teachers depart from schools is significantly higher than that of white teachers, and has also been increasing. In the two decades from the late 1980s to 2008-09, the annual rate of minority teacher turnover increased by 28 percent, undermining minority teacher recruitment efforts. Indeed, the diversification of the teaching force is all the more remarkable because it has occurred in spite of the high turnover rate among minority teachers. We return to the issue of minority teacher turnover in Trend 7.

Trend 6: Consistent in Academic Ability

It is widely believed that the “best and brightest” college students find elementary and secondary teaching less attractive than other career and job options. Over the years, data from different sources have seemed to confirm this. For instance, based on the assumption that academic ability is accurately captured by standardized tests, a number of analyses have shown SAT or ACT scores of college graduates going into teaching have long been well below the average for college graduates. In our own analyses of national data from NCES’ Baccalaureate and Beyond Survey for the undergraduate college class of 1999-2000, we found that this is especially true for those majoring in Education, who tended to have among the lowest average SAT scores. Moreover, within most fields and majors, we found that those who became teachers had lower SAT scores than those in the same field/major who did not go into teaching.

Not only do teachers tend to have below-average academic test scores, some researchers and commentators maintain that the academic ability of teachers has been declining over time—and that gender is at the root of the issue. While the number of women going into teaching has increased, as discussed in Trend 4, proponents of this view have argued that the academic quality of women who choose to go into teaching has gone down. With alternative careers and jobs increasingly available, this view holds that the “best and brightest” women have decreasingly entered traditionally female-dominated occupations and professions, such as teaching. Indeed, some have concluded that women essentially subsidized the education system for most of the previous century because they were relatively high-ability employees working for relatively low wages. But, the argument continues, this subsidy has stopped, and as a result, the academic caliber of the female portion of the teaching force has declined in recent years.

In the data, however, support for this proposition appears to be mixed. One study looking at trends in female standardized test scores from the 1960s to 2000 found a decline in the proportion of female teachers who scored in the high deciles (Corcoran, Evans, & Schwab, 2004). But another study with data from the Educational Testing Service (ETS) showed no decline in SAT scores of teachers as a whole from the mid-1990s to the mid-2000s (Gitomer, 2007).

Of course, we cannot assume that either the “best and brightest,” or those scoring higher on standardized tests, are the best or the most effective teachers. The way to measure both academic ability and teaching quality are subjects of controversy. Moreover, the relationship between teachers’ academic ability and their teaching quality is unclear. But academic ability is often assumed to be an important indicator of the caliber of employees in any line of work, and of the attractiveness of an occupation or profession.

We examined these trends using another possible measure of academic ability—the selectivity or competitiveness of one’s undergraduate institution, which is no doubt correlated with SAT/

ACT and other standardized test scores. The measure we used is Barron's six-category ranking of colleges and universities: most competitive, highly competitive, very competitive, competitive, less competitive, not competitive. In 2007-08 the top two categories accounted for 14 percent of institutions and 21 percent of undergraduates. The bottom two categories accounted for 19 percent of institutions and 13 percent of undergraduates.

What did we find?

About a tenth of newly hired first-year teachers come from the top two categories of higher education institutions. About a fifth to a quarter come from the bottom two categories. About two-thirds of first-year teachers come from middle-level institutions. This has changed little in recent decades. From 1988 to 2012 these proportions tended to fluctuate both up and down slightly, making it impossible to conclude that there is a trend either way (see Figure 10).

Figure 10. Percent 1st-Year Teachers, by Selectivity of Their Undergraduate College/University, 1987-88 to 2011-12

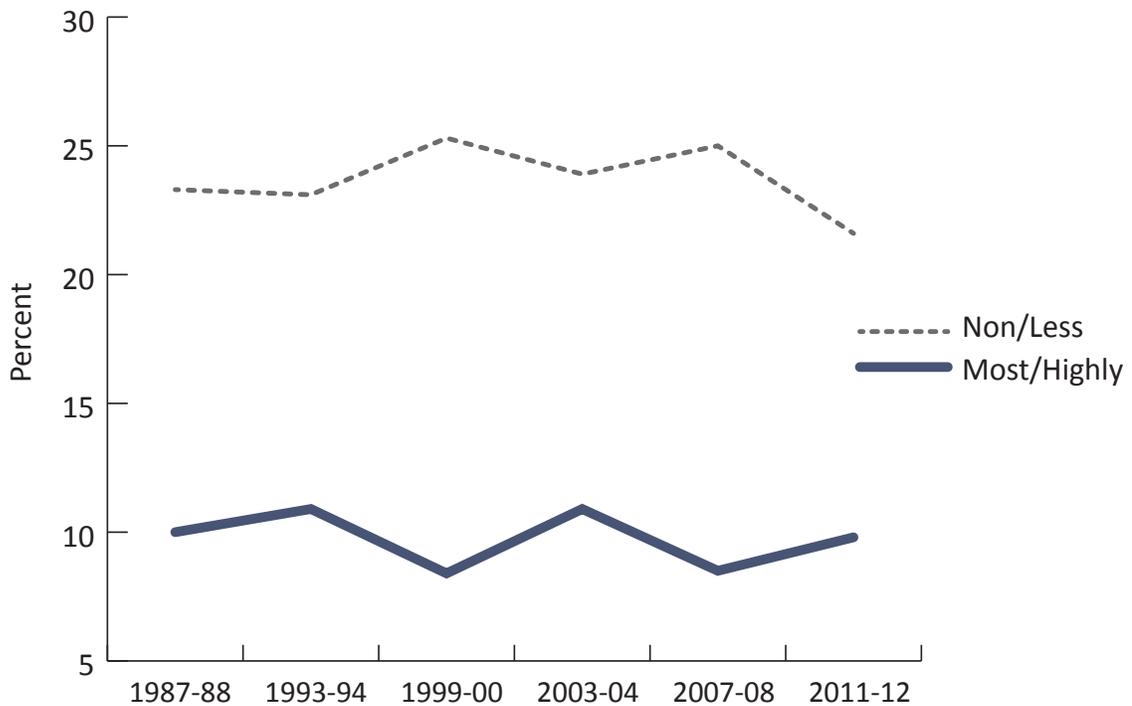
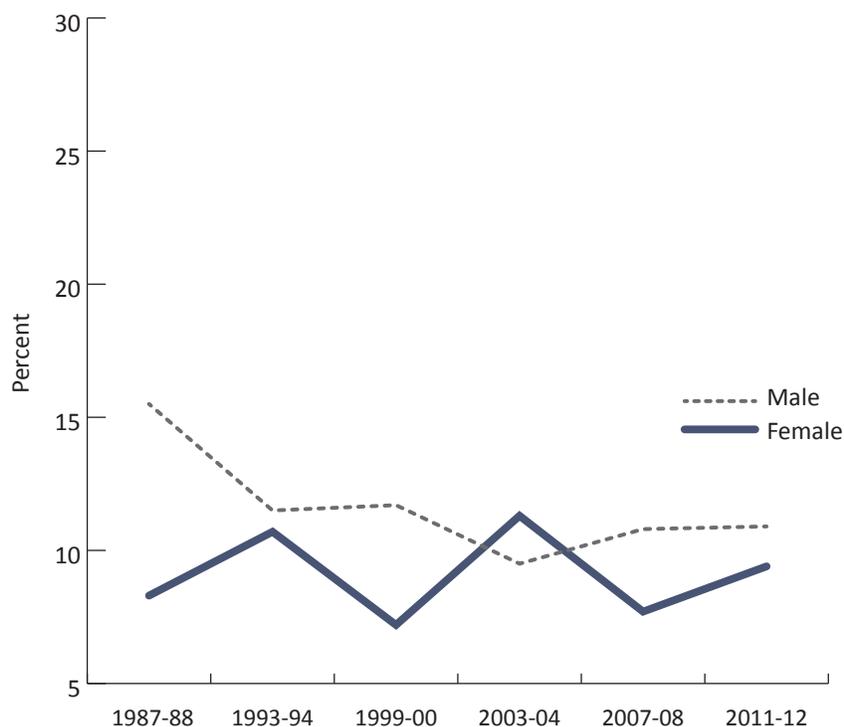


Figure 11. Percent 1st-Year Teachers, with Undergraduate Degrees from the Most and Highly Selective Colleges/Universities, by Gender, 1987-88 to 2011-12



There are, however, important differences in college selectivity by gender.

Interestingly, male teachers have been more likely to come from top-ranked institutions than have female teachers, but decreasingly so in recent years (see Figure 11). Between 1987-88 and 2011-12, there was a significant decrease in the proportion of first-year male teachers from the top two ranks of institutions—from 15.5 percent to 10.9 percent. As a result, by 2011-12 there was little difference in the proportion of male teachers and female teachers coming from top institutions. The data also show that far more male teachers come from the two bottom categories of institutions than from the two top categories, and this has changed little in recent years.

For first-year female teachers, the proportion coming from the top two categories of institutions has fluctuated from year to year. But overall, there was little change for the 24-year period from 1987-88 to 2011-12—an increase of about 1 percent, from 8.3 percent to 9.4 percent (see Figure 11). The data also show that two to three times as many female teachers come from the bottom two categories of institutions, and this also has shown little change in over the past 24 years, going from 23 percent to 21 percent.

Once again, however, these percentages do not tell the whole story. Although the *percentage* of female teachers from top institutions has not changed much since the late 1980s, because the teaching force has ballooned (Trend 1) and has also become more female (Trend 4), *numerically* teaching has been employing far more female candidates from all of higher education, including top colleges and universities. For instance, from 1988 to 2008, during the ballooning, there was a 59 percent increase in the number of first-year female teachers from the top two ranks of institutions. Moreover, there was a 29 percent increase in the number of first-year male teachers from top schools.

Because teaching is such a large occupation, a very large portion of college graduates go into it. For instance, of the college class of 1999, almost one-fifth became teachers after graduation. But it does not appear that teachings' share of college grads, whether from top-, middle-, or bottom-ranked institutions, has increased during this period, simply because the number of graduates of four-year colleges and universities has also simultaneously gone up, by 57 percent.

Hence, assuming our college selectivity measure of academic ability is valid, our data show that there has been a decrease in the proportion of male teachers from top institutions since the late 1980s. But these data also show this trend has *not* been true of female teachers. Perhaps we should call the latter a non-trend. And, in sheer numbers, teaching is getting far more of both males and females from top institutions than before. So, contrary to the view that there has been a decline in the academic caliber of female teachers, our data suggest this has not been true in recent decades.

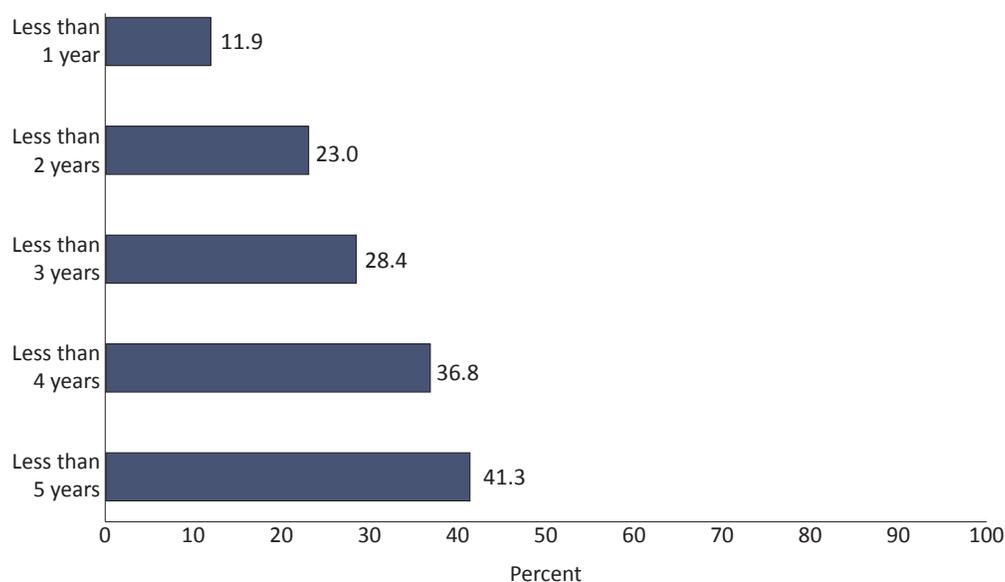
Along with the increase in the numbers and proportions of female teachers, we do not know the reasons for the apparent stability, or even improvement, in the academic ability of females entering teaching in recent decades. As we suggested in Trend 4, perhaps the increased opportunities for women in school leadership and positions in secondary schools (see Figure 8) have been attractive incentives for able and ambitious females to enter education.

Trend 7: Less Stable

Elementary and secondary teaching has long been marked by relatively high rates of annual departures of teachers from schools and from teaching altogether (Lortie, 1975; Tyack, 1974). Analyzing national data, we found that, as one might expect, teaching does have less attrition—those leaving the occupation entirely—than some other occupations, such as child care, secretarial, and paralegal fields; teacher attrition is similar to that of police officers; and, teaching has higher attrition, perhaps surprisingly, than nursing, and far higher turnover than traditionally highly respected professions, such as law, engineering, architecture and academia (Ingersoll & Perda, forthcoming).

Moreover, the data show that the teaching force has slowly but steadily become less stable in recent years. For instance, from 1988-89 to 2008-09, annual attrition from the teaching force as a whole rose by 41 percent, from 6.4 percent to 9 percent. But these overall figures mask large differences in overall turnover among different types of teachers and different locales, revealing the need to disaggregate our data. These departures include both movers (teachers who move between districts and schools) and leavers (those who leave teaching altogether). The flow of teachers out of schools is not equally distributed across states, regions, and school districts. The largest variations in teacher turnover by location, however, are those between different schools, even within the same district. The data show that in 2004-05, 45 percent of all public school teacher turnover took place in just one quarter of the population of public schools. The data show that high-poverty, high-minority, urban, and rural public schools have among the highest rates of turnover. Moreover, the data show there is an annual asymmetric reshuffling of significant numbers of employed teachers from poor to not poor schools, from high-minority to low-minority schools, and from urban to suburban schools (Ingersoll, 2011; Ingersoll & May, 2012).

Figure 12. Cumulative Percent Attrition of Beginning Teachers, by Years of Experience, 1993-03

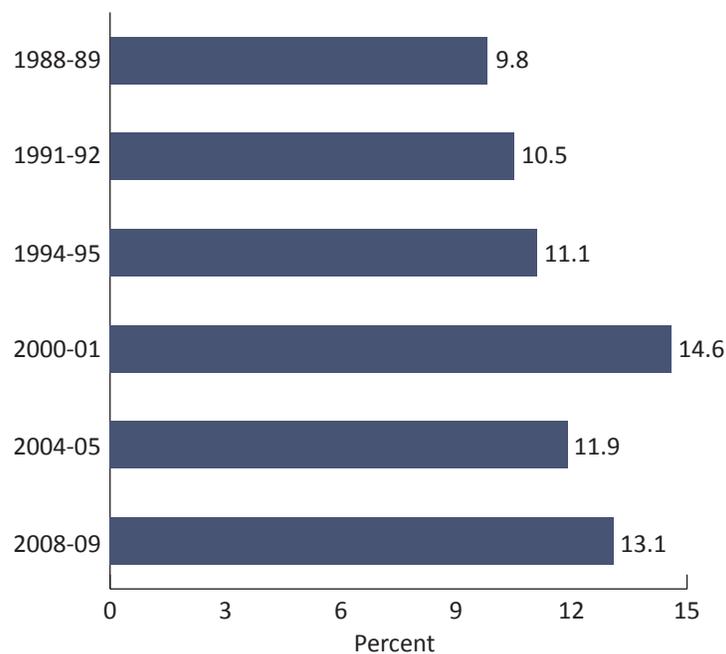


Source: Perda, D. 2013. Transitions Into and Out of Teaching: A Longitudinal Analysis of Early Career Teacher Turnover. PhD Dissertation, University of Pennsylvania.

The data also show that rates of both moving between schools and leaving teaching altogether differ by the race/ethnicity of the teacher. As mentioned in Trend 5, over the past couple of

decades, minority teachers have had significantly higher rates of turnover than white teachers. Moreover, the gap has widened in recent years. Why is this? Strikingly, while the demographic characteristics of schools appear to be highly important to minority teachers' initial decisions as to where to teach, this doesn't appear to be the case for their later decisions about whether to stay or depart. What does impact their decisions, our analyses show, are school working conditions, in particular the degree of autonomy and discretion teachers are allowed over issues that arise in their classrooms, and the level of collective faculty influence over school-wide decisions that affect teachers' jobs. The same difficult-to-staff schools that are more likely to employ minority teachers are also more likely to offer less-than-desirable working conditions, according to our data, and these conditions account for the higher rates of minority teacher turnover. These high levels of turnover, of course, undermine efforts to diversify the teaching force (Ingersoll & May, 2011a, 2011b).

Figure 13. Percent Annual 1st-Year Teacher Attrition, 1988-89 to 2008-09

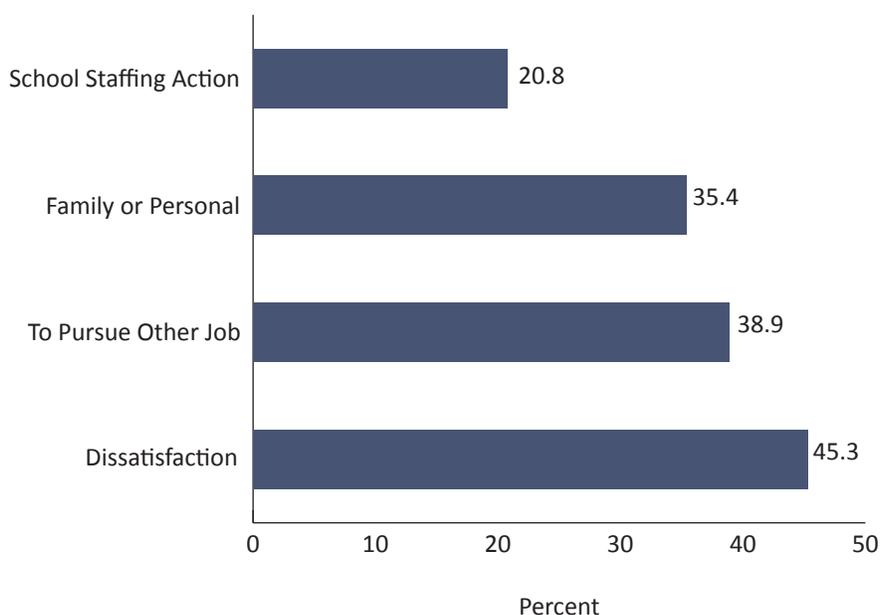


However, beginners, regardless of their race, have the highest rates of turnover of any group of teachers. Over a decade ago we estimated that between 40 to 50 percent of those who enter teaching leave teaching within 5 years (Ingersoll, 2003). This figure has been widely reported since, but it was only a rough estimate using cross-sectional national data. Recently, using national longitudinal data, Perda (2013) was able to more accurately document rates of cumulative beginning attrition. He found that more than 41 percent of new teachers leave

teaching within 5 years of entry (see Figure 12). Moreover, we have also found that these already high levels have been going up since the late 1980s. Rates of leaving for first-year teachers rose from 9.8 to 13.1 percent from 1988 to 2008—a 34 percent increase (Figure 13). Again, however, an increase in the annual percentage does not tell the whole story. Since the teaching force has grown dramatically larger, *numerically* there are far more beginners than before (Trend 3), and hence the actual numbers of teachers who quit the occupation after their first year on the job has also soared. Soon after the 1987-88 school year, about 6,000 first-year teachers left teaching, while just after the 2007-08 school year, more than four times as many—about 25,000—left the occupation. Not only are there far more beginners in the teaching force, but these beginners are less likely to stay in teaching.

We also examined the data on the reasons teachers give for their attrition. Of first-year teachers who left after the end of the 2007-08 school year, a fifth indicated they had been laid off or terminated. This included both budgetary and performance reasons. A larger portion indicated that family or personal issues played an important part in their decision to leave. This set included reasons of health, pregnancy, a residence move, and caring for family members.

Figure 14. Percent 1st-Yr. School Teachers Reporting that Various Reasons were Important for their Attrition, 2008-09



An even larger portion indicated they left to pursue further education or another career. Finally, the most frequently cited set of reasons concerned dissatisfaction with any of a variety of school and working conditions, including salaries, classroom resources, student misbehavior,

accountability, opportunities for development, input into decision making, and school leadership (Figure 14).

In sum, members of the largest group within the largest occupation in the nation have been leaving at relatively high rates, and these rates have steadily increased in recent decades. Together, ballooning and attrition indicate a growing flux and instability in the teaching occupation, as both the number of those entering teaching and the number of those leaving teaching have been increasing in recent years.

These changes have large implications. Employee turnover in any occupation has pros and cons, costs and benefits. On the one hand, some degree of employee turnover, with the accompanying job and career changes, is normal, inevitable, and can be efficacious for individuals, for organizations, and for the economic system as a whole. Too little turnover of employees is tied to stagnancy in organizations; effective organizations usually both promote and benefit from a limited degree of turnover by eliminating low-caliber performers and bringing in “new blood” to promote innovation.

On the other hand, high levels of employee departures are worrisome not only because they can be a symptom of underlying problems in how well organizations function, but also because departures can entail costs and other negative consequences for organizations and for the larger system (Ingersoll & Perda, forthcoming).

As mentioned earlier, we have found that one negative consequence of teacher turnover is its important but often overlooked role in teacher shortages (Ingersoll, 2011; Ingersoll & Perda 2010). Turnover is a major factor behind the problems that many schools have staffing their classrooms with qualified mathematics, science, and other teachers. Increases in turnover among minority teachers, especially in disadvantaged schools, undermine efforts to recruit new teachers in hard-to-staff schools and to diversify the teaching force.

Another negative consequence of high levels of beginning teacher attrition is the loss of newcomers before they are able to fully develop their skills. As mentioned earlier, a number of studies have documented the reasonable proposition that teachers’ effectiveness—as measured by gains in their students’ test scores—increases significantly with additional experience for the first several years in teaching (e.g., Henry, Fortner & Bastian, 2012; Kane, Rockoff, & Staiger, 2006).

Conclusion

Has the elementary and secondary teaching force changed in recent years? The answer is most certainly yes—and in a number of important ways. It has become far larger. It has simultaneously become both older and younger and far less experienced. It has simultaneously become less diverse, by gender, and more diverse, by race-ethnicity. It does not appear to be suffering from a decline in the academic ability of females entering teaching; indeed, the numbers of new teacher hires coming from the top-ranked colleges and universities has greatly increased. Finally, it has become less stable.

For each of these trends, or non-trends, large questions immediately arise. What are the reasons for, and sources of, the trend? Will the trend continue, and what impact will it have? In this report we have offered some hypotheses for these questions.

It is also striking that while these trends raise important questions, until recently we have seen little awareness or discussion of them or their implications—whether by researchers, by policy makers, by educators, or by the public. But there are good reasons to investigate the sources and continuation of these changes—because if these trends do indeed continue, there will be large implications, with serious financial, structural, and educational consequences for America's educational system.

For instance, will the teaching force continue to outgrow the student population it serves, and, if so, why? If the teaching force does continue to balloon in size, the expense to local school districts could become unsustainable, and without an increase in funds, districts may increasingly turn to cutting teacher salary levels.

Will the hiring, and thus the greening trend, continue? In turn, will an increasing number of new hires decide not to stay in teaching, making teaching increasingly an occupation practiced by the young and inexperienced, and if so, why? If this trend continues, the expense to local school districts could become more sustainable, because of lower overall average salary costs per employee. In other words, will there effectively be a financial tradeoff between the numbers of teachers and their experience? On the other hand, as the older portion of the teaching force finishes retiring, will a large portion of the newcomers decide to stay with teaching to become the next generation of veterans?

Will the teaching force continue to become more female, and if so, why? If the teaching force does continue to become even more female-dominated, with the presence of male role models a rarity for an increasing number of students in their K-12 school years, will there be negative implications for students, both male and female?

Perhaps there is an irony in these changes. Historians tell us that when the public school system

was invented a century ago, the teaching force was transformed into a mass occupation that was relatively low-paying, temporary, and designed predominantly for young, inexperienced women, prior to starting their “real” career of child rearing (e.g., Lortie, 1975; Tyack, 1974). Perhaps the changes we have traced represent not an entirely new face but a return to the old face of the American teaching force.

A return to an old structure could have serious implications for the future status of elementary and secondary teaching in the United States. Professionalization has long been a source of both hope and frustration for teachers. Since early in the 20th century, educators have repeatedly sought to upend the notion that teaching is akin to lower-skill industrial work where teachers are interchangeable and easily replaced, and they have sought to promote the view that teaching is highly complex work, requiring specialized knowledge and skills, and deserving of the same status as traditional professions, like law, medicine, engineering, and academia. These efforts to enhance the professional status of teaching have also long met with limited success. And if teaching becomes an even larger, lower-paying line of work, predominantly employing young, inexperienced women, who stay for limited periods, it does not suggest optimism for the aspirations to promote the image of teaching as a respected profession.

At the same time, these possible future trajectories, and similarities between the contemporary transformation of the teaching force and its previous incarnation, are strictly speculative on our part. Nothing in our data analyses so far can be considered conclusive evidence that the teaching force is, or will be, “better” or “worse” in one way or another. As we indicated at the beginning of this report, thus far our objective has been exploratory and suggestive. At this point we have more questions than answers.

What is clear is that large-scale changes are happening to the nation’s largest occupational group. Right after World War II and before the post-war baby boom, there were just over three-quarters of a million elementary and secondary teachers in the United States. By 2011-12, there were over five times as many—almost 4 million elementary and secondary teachers. In the 2007-08 school year alone, almost a quarter of a million newcomers entered teaching. These data suggest a very large opportunity—the largest occupation in the nation is being expanded, replaced, and re-made. Who will our new teachers be? We plan to undertake further research to answer this question.

References

- Barron's *Profiles of American Colleges* (28th edition). (2009). Hauppauge, NY: Author.
- Bureau of Labor Statistics. (2011). *Women in the Labor Force: A Databook*.
- Corcoran, S., Evans, W., & Schwab, R. (2004). Changing labor-market opportunities for women and the quality of teachers, 1957-2000. *Papers and Proceedings of the American Economic Review*, 94(2): 230-235.
- Gitomer, D. H. (2007). *Teacher quality in a changing policy landscape: Improvements in the teacher pool*. Policy Information Report. Princeton, NJ: Educational Testing Service.
- Henry, G., Fortner, K., & Bastian, K. (2012). The effects of experience and attrition for novice high school science and mathematics teachers. *Science*, 335:1118-1121.
- Ingersoll, R. (2003). *Is there really a teacher shortage?* CPRE Research Report # R-03-4. Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.
- Ingersoll, R. (2011). Do we produce enough mathematics and science teachers? *Phi Delta Kappan*, 92(6) 37-41.
- Ingersoll, R. & May, H. (2011a). The minority teacher shortage: Fact or fable?" *Phi Delta Kappan*, 93(1) 62-65.
- Ingersoll, R., & May, H. (2011b). *Recruitment, retention and the minority teacher shortage*. CPRE Research Report # RR-69. Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.
- Ingersoll, R., & May, H. (2012). The magnitude, destinations and determinants of mathematics and science teacher turnover. *Educational Evaluation and Policy Analysis*, 34(4), 435-464.
- Ingersoll, R., & Merrill, E. (2010). Who's teaching our children? *Educational Leadership*, 67: 14-20.
- Ingersoll, R., & Perda, D. (2010). Is the supply of mathematics and science teachers sufficient? *American Educational Research Journal*, 20: (3): 1-32.
- Ingersoll, R., & Perda, D. (forthcoming). *How high is teacher turnover and is it a problem?* Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.
- Ingersoll, R., & Strong, M. (2011). The impact of induction and mentoring for beginning teachers: A critical review of the research. *Review of Educational Research*, 81(2): 201-233.
- Irvine, J.J. (1988). An analysis of the problem of the disappearing Black educator. *Elementary School Journal*, 88(5), 503-514.
- Kane, T. J., Rockoff, J. E., & Staiger, D. O. (2006). *What does certification tell us about teacher effectiveness? Evidence from New York City*. Working Paper no. 12155, National Bureau of Economic Research, Cambridge, MA

- Kirst, M. (1984). *Who controls our schools?* New York: W.H. Freeman and Co.
- Krugman, P. R. (2012). *End this depression now!* New York: W.W. Norton & Co.
- Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465-491.
- Lortie, D. (1975). *School teacher*. Chicago: University of Chicago Press.
- Moore, Stephen. (April 1, 2011). We've become a nation of takers, not makers. P. A15. *Wall Street Journal*.
- National Academy of Sciences. (1987). *Toward understanding teacher supply and demand*. Washington, DC: National Academies Press.
- National Academy of Sciences. (2007). *Rising above the gathering storm*. Washington, DC: National Academies Press.
- National Center for Education Statistics. (2005). *Schools and staffing survey (SASS) and teacher followup survey (TFS)*. Data File. Washington, DC: U.S. Department of Education. Available from <http://nces.ed.gov/surveys/SASS/>
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: Government Printing Office.
- National Commission on Mathematics and Science Teaching for the 21st Century (the John Glenn Commission). (2000). *Before it's too late*. Washington, DC: Government Printing Office.
- National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future*. New York: author
- National Commission on Teaching and America's Future. (1997). *Doing what matters most: Investing in quality teaching*. New York: author.
- National Research Council. (2002). *Learning and understanding: Improving advanced study of mathematics and science in U.S. schools*. Washington, DC: National Academies Press.
- Perda, D. (2013). *Transitions into and out of teaching: A longitudinal analysis of early career teacher turnover* (Unpublished doctoral dissertation). University of Pennsylvania, Philadelphia.
- Scafidi, B. (2013). *The school staffing surge: Decades of employment growth in America's schools*. Indianapolis, IN: Friedman Foundation.
- Strober, M. & Tyack, D. (1980). Why do women teach and men manage? *Signs*, 5, 499-500.
- Torres, J., Santos, J., Peck, N. L., & Cortes, L. (2004). *Minority teacher recruitment, development, and retention*. Providence, RI: Brown University, Educational Alliance.
- Tyack, D. (1974). *The one best system*. Cambridge, MA: Harvard University Press.

- U.S. Department of Education, Institute of Education Sciences. (2009). NAEP 2008: *Trends in academic progress*. Washington: National Center for Education Statistics.
- Villegas, A. M. & Lucas, T. (2004). Diversifying the teacher workforce: A retrospective and prospective analysis. In M.A. Smylie & D. Miretzky (Eds.), *Developing the teacher workforce (103rd Yearbook of the National Society for the Study of Education, Part 1)* (pp. 70-104). Chicago, IL: University of Chicago Press.
- Zumwalt, K., & Craig, E. (2005). Teachers' characteristics: Research on the demographic profile. In M. Cochran-Smith & K.M. Zeichner (Eds.), *Studying teacher education: The report of the AERA panel on research and teacher education* (pp. 111-156). Mahwah, NJ: Lawrence Erlbaum.

CONSORTIUM *for* POLICY RESEARCH *in* EDUCATION

University of Pennsylvania | Teachers College, Columbia University | Harvard University | Stanford University
University of Michigan | University of Wisconsin-Madison | Northwestern University

cpre.org