Policy Information Report

Teacher Quality in a Changing Policy Landscape: Improvements in the Teacher Pool

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This report was written by:

Drew H. Gitomer
Educational Testing Service

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Policy Information Center
Mail Stop 19-R
Educational Testing Service
Rosedale Road
Princeton, NJ 08541-0001
(609) 734-5212
pic@ets.org

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December 2007
Policy Evaluation and
Research Center
Policy Information Center
Educational Testing Service

Table of Contents

Preface

While concern about the quality of the nation's teaching force can be traced back to the early 20th century, during the past 25 years there has been a growing amount of evidence and recognition that teacher quality is a key factor in student achievement. From *A Nation at Risk* in 1983, to the National Education Summit in 1989, to the formation of the National Commission on Teaching and America's Future in 1994, and the No Child Left Behind Act in 2001, teacher quality has remained squarely in the middle of national and state education agendas. At the same time, more and more evidence has been accumulated to show the link between teacher ability and student achievement.

As a result, during the last decade we have witnessed an explosion of policy activity aimed at improving teacher quality. These policies have been established at federal, state, local, and institutional levels, and they focus on ensuring that teachers are qualified to teach the subject matter they are assigned or elect to teach, and that institutions and agencies that prepare and certify teachers and accredit the institutions that prepare them are accountable for the fruits of their programs and processes.

To examine whether changes in the academic quality of the teaching force are associated with this unprecedented policy focus, ETS Distinguished Research Scientist, Dr. Drew Gitomer, revisits an earlier study of teacher quality to see if the academic quality of prospective teachers in a recent cohort has changed from that of an earlier cohort.

His findings are both encouraging and sobering. The encouraging news is that, taken together, the findings suggest that recent policy initiatives have helped improve the academic quality of the teacher pool. Among the sobering findings is the fact that the pool is no more diverse now than it was a decade ago. Nevertheless, the promising changes observed bode well for our nation's elementary and secondary students. Gitomer's research demonstrates strongly that when stakeholders target and focus on a common objective, positive change can occur. And seldom does such change come in so brief a time.

Michael T. Nettles
Senior Vice President
Policy Evaluation and Research Center

Acknowledgments

The author would like to thank the College Board for providing access to the SAT® data included in this study. Thanks especially to Ellen Sawtell, Andrew Wiley, and Wayne Camara for making this possible. The author would also like to thank the many ETS colleagues who helped in the development of this research. Vincent Weng, Michele Najarian, and Fred Yan all contributed to the matching and structuring of the data. Waverely VanWinkle conducted countless analyses and provided great support throughout. Jane Cairns composed the figures and tables and ably assisted with the composition of the report. The cover was designed by Marita Gray and Christina Guzikowski provided desktop publishing services.

Many individuals provided extremely helpful feedback on drafts of the report, helping to clarify and hone ideas and language. Special thanks go to Paul Barton, Duncan Chaplin, Richard Coley, Florence Cucchi, Carol Dwyer, Art Wise, Holly Yettick, and Karen Zumwalt. Kim Fryer did a superb job editing the report. Finally, Richard Coley provided the Policy Information Center leadership to make this report possible. Despite the contributions of so many, errors of fact or interpretation are solely the responsibility of the author.

The past eight years have seen an unprecedented level of education policy activity focused on issues of teacher quality. Policies have been developed at federal, state, and institutional levels, and include increased institutional reporting of teacher candidates' test scores, the mandate for Highly Qualified Teachers (HQT) in the No Child Left Behind Act, more stringent requirements for entry into and accreditation of teacher education programs, and the rapid expansion of alternate pathways into teaching.

To determine whether these policies were accompanied by changes in the academic quality of prospective teachers, this study focuses on *Praxis* candidates from the years 2002 through 2005, and compares this cohort with an earlier cohort of prospective teachers (1994 to 1997) included in an earlier ETS study.* In order to make appropriate comparisons, the study included 20 states and the District of Columbia, all of which used *Praxis*™ assessments for teacher licensure testing for both cohort periods.** The primary data reported are *Praxis II*® passing rates, SAT® scores, and undergraduate grade point averages (GPA) for candidates with different demographic, teacher preparation, and teacher experience backgrounds.

The demographic characteristics of the *Praxis* candidates have changed relatively little between the two cohorts. Prospective teachers continue to be predominantly White, female, and native English-speaking. Modest increases in mother's education level likely reflect general population trends.

However, there were some very notable changes in the educational and prior teaching histories of candidates taking *Praxis II* tests. Candidates in the more recent cohort have stronger undergraduate GPAs than their predecessors. These candidates also are more likely to take *Praxis II* tests well after they have completed college. A larger proportion of candidates new to the field of teaching are now pursuing teaching through alternative routes. Increasing proportions of *Praxis* candidates now have prior teaching experience, particularly individuals who were formerly in university-based teacher preparation programs.

Comparisons of overall licensure patterns and academic quality between the two time periods revealed the following:

- *Praxis* passing rates have decreased substantially. This decrease is likely attributable to the increasingly demanding testing requirements put in place during the eight years.
- The academic profile of the entire candidate pool has improved. Candidates who graduate from teacher education programs are stronger than in years past. Those who report not having gone through a teacher education program are similarly strong.
- The academic profile of those meeting state *Praxis* requirements has improved.
- These improvements are consistent for both males and females, across racial/ethnic groups, and across licensure areas.
- Academic profiles continue to be markedly different for secondary school subject matter teachers in contrast with elementary, special education, and physical education teachers. Those with secondary licenses have much stronger academic histories.

One of the major changes in licensure practices that occurred during this time period was the institution of middle-school content tests that were intended to satisfy the HQT requirements that teachers be qualified in the content areas in which they teach. *Praxis* test takers of the middle-school tests have academic profiles much more similar to those of elementary teachers than to those of secondary teachers. They tend to major in education and have relatively low SAT scores.

Taken together, the study's findings suggest that recent policy initiatives have helped improve the quality of the teacher pool as measured by SAT scores and college grades. In most cases, however, it is difficult to assign particular changes to specific policies because the policies have been implemented at so many points in the system. The observed changes

* Drew H. Gitomer, Andrew S. Latham, and Robert Ziomek, *The Academic Quality of Prospective Teachers: The Impact of Admissions and Licensure Testing,* Teaching and Learning Research Report Series, Princeton, NJ: Educational Testing Service, 1999. (www.ets.org/Media/Research/pdf/RR-03-35.pdf)

** *The Praxis Series*® assessments provide educational tests and other services that states use as part of their teaching licensing certification process. The *Praxis I*® tests measure basic academic skills, and the *Praxis II*® tests measure general and subject-specific knowledge and teaching skills.

are large for the world of education policy and have occurred over a relatively brief time span. This confluence of policy changes at the institutional, state, and federal levels is associated with positive changes in the profile of prospective teachers.

Despite the encouraging news contained in this report, several challenges remain. First, although the academic quality of prospective teachers has increased for all racial/ethnic groups, today's prospective teaching pool is no more diverse than it was a decade ago. A second challenge that remains is the relatively weak SAT scores and GPAs of those who seek elementary, physical, or special education certifications.

Nevertheless, the promising changes observed in this study bode well for the academic achievement of the nation's K-12 population. Since research has shown that teachers' academic ability is associated with improved student learning, the increases in the academic quality of the teacher pool shown in this study should have a long-term impact on educational achievement.

While this study is limited to those individuals who have taken the *Praxis II* licensure tests, future research should explore what these observed changes mean for hiring and retention in different kinds of schools and districts. For example, in what types of schools are teachers with different characteristics actually teaching?

This study demonstrates that when policies target a common objective and employ a variety of strategies with a focused objective, real change can occur. Seldom have changes in education policies been associated with such positive impact in so short a time.

Introduction

The past eight years have seen, arguably, the most intensive development in American history of educational policy intended to address issues of teacher quality. Policies have been established at national, state, local, and institutional levels. Federal policies have mandated reporting of state and institutional data on teacher candidates and also mandated that all teachers meet state requirements for being highly qualified in the subjects that they teach. States and institutions have increased the academic requirements for becoming teachers, often establishing or raising minimum grade point average (GPA) requirements for entry into and/or graduation from teacher education programs and for obtaining licensure. Accreditation processes have also become more rigorous and focused on student outcomes at the same time that more states are mandating accreditation. Finally, policies have been established that have encouraged alternate routes to teacher certification. These policies are, at least in part, intended to encourage entry of more academically qualified individuals into the profession.

The abundance of activity during the 1990s targeted at improving the strength of the teaching profession led researchers Drew H. Gitomer, Andrew S. Latham, and Robert Ziomek to examine whether they could identify changes in the characteristics of the pool of prospective teachers. In 1999, Educational Testing Service released a report based on their findings that described some of the demographic and academic characteristics of prospective teachers. The report, *The Academic Quality of Prospective Teachers*, was based on data from *Praxis*™ candidates from 1994 through 1997.[1] The current study continues this research by focusing on *Praxis* candidates from the years 2002 through 2005 and comparing this cohort with the prospective teachers included in the earlier study.[2]

The focus on the academic quality of prospective teachers in the earlier report grew out of serious concerns about the academic ability of teachers that date back at least 85 years.[3] These concerns were exacerbated by a growing body of research establishing an association between teacher verbal ability, as measured by standardized tests, and student achievement on standardized tests.[4]

The earlier report also examined how licensure testing could affect the demographic and academic characteristics of the prospective teaching pool, since, by definition, licensure restricts the overall pool as it attempts to ensure certain expectations of quality. The nation continued to struggle to maintain a qualified teaching force whose racial/ethnic composition was reflective of the demographic diversity of students in public education.

The earlier study merged SAT and ACT® college admissions test data from 1977 through 1995 with

[1] Drew H. Gitomer, Andrew S. Latham, and Robert Ziomek, *The Academic Quality of Prospective Teachers: The Impact of Admissions and Licensure Testing,* Teaching and Learning Research Report Series, Educational Testing Service, 1999.

[2] *The Praxis Series* assessments provide educational tests and other services that states use as part of their teaching licensing certification process. The *Praxis I*® tests measure basic academic skills, and the *Praxis II*® tests measure general and subject-specific knowledge and teaching skills.

[3] Carnegie Forum on Education and the Economy, *A Nation Prepared: Teachers for the 21st Century*, Carnegie Corporation of New York, New York, 1986; Ruth B. Ekstrom and Margaret E. Goertz, *The Teacher Pipeline: The View from Four States*, a paper given at the annual meeting of the American Educational Research Association, Chicago, IL, March 1985; Walt Haney, George Madaus, and Amelia Kreitzer, "Charms Talismanic: Testing Teachers for the Improvement of American Education," in Ernst Z. Rothkopf (ed.), *Review of Research in Education*, American Educational Research Association 1987; Donna H. Kerr, "Teaching Competence and Teacher Education in the United States," in L. S. Shulman and G. Sykes (eds.), *Handbook of Teaching and Policy*, Longman, 1983; James D. Koerner, *The Miseducation of American Teachers*, Houghton Mifflin, 1963; Ellen C. Lagemann, *An Elusive Science: The Troubling History of Education Research*, 1st ed, The University of Chicago Press, 2000; Judith E. Lanier, "Research on Teacher Education," in M. C. Wittrock (ed.), *Handbook of Research on Teaching*, Macmillan, 1986; J. B. Lee, *Tomorrow's Teachers*, U.S. Department of Education, 1984; Thomas Sowell, *Inside American Education: The Decline, the Deception, the Dogmas*, The Free Press, 1993; W. Timothy Weaver, *America's Teacher Quality Problem: Alternatives for Reform*, Praeger, 1983.

[4] James S. Coleman, et al., *Equality of Educational Opportunity*, U. S. Office of Education, 1966; Ronald G. Ehrenberg and Dominic J. Brewer, "Did Teachers' Verbal Ability and Race Matter in the 1960s? Coleman Revisited," *Economics of Education Review*, Vol. 14, No. 1, 1995; Ronald F. Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal on Legislation*, Vol. 28, 1991; Rob Greenwald, Larry V. Hedges, and Richard D. Laine, "The Effect of School Resources on Student Achievement," *Review of Educational Research*, Vol. 66, No. 3, 1996; Larry V. Hedges and Rob Greenwald, "Have Times Changed? The Relation Between School Resources and Student Performance," in G. Burtless (ed.), *Does Money Matter? The Effect of School Resources on Student Achievement and Adult Success*, Brookings Institution Press, 1996; Robert P. Strauss and Elizabeth A. Sawyer, "Some New Evidence on Teacher and Student Competencies," *Economics of Education Review*, Vol. 5, 1986.

data from more than 300,000 prospective teachers who took a teacher education entrance exam (*Praxis I*®) or teacher licensure test (*Praxis II*®) from *The Praxis Series*™ between 1994 and 1997. College admissions tests were used as a proxy for academic quality. In acknowledging the limitations of these measures as a proxy, the researchers provided the following justification:[5]

> Obviously, these standardized test scores present a narrow picture of an individual's academic skills, and there are unquestionably many more facets to "academic ability" than SAT and ACT scores. Nevertheless, we know of no other widely available data that enable trustworthy comparisons of individuals' academic qualities.
>
> … We do not mean to imply in any way that candidates who perform well on the SAT or ACT will automatically make good teachers, nor that someone who performs poorly on the SAT or ACT cannot excel as a teacher.… So while SAT and ACT scores provide an incomplete proxy for academic ability, and many qualities unrelated to academic ability go into making an accomplished teacher, "it would be absurd to argue that academic ability is not or should not be at least one measure of teacher quality."[6]

The study used SAT and ACT scores to compare teachers with other college graduates. Many of the claims that teachers were drawn from the lower end of the academic distribution were derived from the fact that year after year, high school seniors who indicated that they intended to major in education scored lower, on average, on college admissions tests of verbal and quantitative ability than peers who were also college-bound.[7] However, when the research focused on people who made an actual step toward pursuing teaching by taking a *Praxis II* test, it became clear that teacher academic ability varied widely by the type of licensure sought. Candidates seeking licenses in academic subject areas had higher average college admissions test scores than candidates pursuing general fields like elementary education.[8] The report's data contradicted previous research by suggesting that teachers in academic subject areas had academic abilities that were equal to or higher than those of the general college graduate population.

The researchers also investigated how teacher testing influenced other characteristics of the prospective teaching pool. They found that scores on licensure tests were positively associated with average SAT and ACT scores of prospective teachers, but, at the same time, limited the overall supply of teachers. The potential pool started out as a homogeneous population, composed primarily of White female students. Differences in passing rates on teacher tests further decreased the racial diversity of the pool. The fact that college GPA data were highly correlated with the SAT and ACT scores suggested that the study's findings reflected general academic ability, rather than simply students' performances on standardized tests.

The final question that the earlier research explored was the potential impact of increasing the passing scores of licensure tests on the teaching pool. Modeling the impact of different passing score requirements demonstrated that making it tougher to pass *Praxis* tests would increase mean SAT scores of those passing the tests, while dramatically decreasing the diversity and supply of new teachers.

The Changing Policy Environment

The earlier report provided a baseline that can be revisited in light of the current unprecedented policy activity targeted at improving teacher quality. The present report highlights five policies or policy directions that have been implemented during the intervening years (since 1997) and examines changes in the quality of the teacher pool in light of those initiatives. However, when multiple policies are implemented that all share a common goal, such as the improvement of teacher quality, it is not possible

[5] Gitomer, Latham, and Ziomek, 1999, pp. 11-12.
[6] Weaver, 1983, as quoted in Gitomer, Latham, and Ziomek, 1999, p. 1.
[7] ACT, *The High School Profile Report: Normative Data*, 1997; The College Board, *College Bound Seniors: A Profile of SAT Program Test Takers*, 1997.
[8] Robin R. Henke et al., *Out of the Lecture Hall and into the Classroom: 1992-93 College Graduates and Elementary/Secondary School Teaching*, NCES 96-899, U.S. Department of Education, National Center for Education Statistics, Office of Educational Research and Improvement, 1996; Gitomer, Latham, and Ziomek, 1999.

to ascribe any specific change in the teacher pool to any single policy. In fact, meaningful change may be more likely to happen as the result of a confluence of discrete policy initiatives all targeted to a common goal. Therefore, this report interprets findings about the quality of the teacher pool within the context of a changing policy landscape and generally avoids directly ascribing particular findings to particular policies. Nevertheless, there are several exceptions for which there is direct evidence of specific policies having an impact on teacher licensure testing, and these will be highlighted as well.

1. Increasing accountability of teacher education programs.

In 1998, the reauthorized federal Higher Education Act[9] required all states and institutions that prepared teachers to report the licensure test passing rates for those who had completed programs of training. This information was reported publicly and was also used to identify low-performing teacher preparation programs. This led to a predictable result: Teacher education programs made licensing tests a prerequisite for program completion. This meant that for many institutions, the passing rates for program completers were always 100 percent. Although there was some concern that these reports of high passing rates across the board were not particularly useful, the fact is that more rigorous standards were being applied by teacher education institutions, even if the public reporting was not as transparent as some would have liked.[10] Thus, the primary goal of ensuring that candidates from teacher education programs passed licensure tests was achieved by this legislation.

2. Ensuring the qualifications of all teachers.

In 2001, the reauthorization of the federal Elementary and Secondary Education Act, known as No Child Left Behind (NCLB),[11] included the Highly Qualified Teacher (HQT) Provision mandating that all students were to be taught by teachers who not only were licensed, but who also had demonstrated competence in the subject matter that they taught. This provision was intended to address the widespread practice of out-of-field teaching.[12] No longer could a general elementary certification satisfy the requirement for teaching middle-school math, science, or social studies, for example. NCLB also prohibited the widespread practice of allowing unlicensed teachers to practice with emergency credentials. In most states, subject matter competence can be demonstrated through a college major in a subject or by passing a state licensure test in the subject area. This led to the expansion of teacher licensure testing to almost every U.S. state.

3. Increasing requirements for entry into teacher education programs.

During the last decade, some states have set performance standards for those entering teacher education programs. For example, in 2000, Pennsylvania mandated that all teacher education candidates have minimum GPAs in their college courses prior to admission into the teacher preparation program.[13] Many teacher education programs across the country also instituted similar, more rigorous, admissions criteria.

4. Strengthening teacher quality requirements for accreditation.

Accreditation has placed a much greater emphasis on outcome measures for students in teacher education programs. The National Council for Accreditation of Teacher Education (NCATE) currently reviews and accredits more than 600 colleges and universities that prepare teachers. In 2000, NCATE introduced a new set of standards that moved from a primary focus on the teacher education curriculum to one that also emphasized demonstration of knowledge and skills by teacher candidates. Included in the standards were specific expectations for teacher candidate success on state licensure tests in order for institutions to gain accreditation.[14] A newer and much smaller accreditation body (41 accredited institutions),

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[9] *1998 Amendments to the Higher Education Act of 1965 (Higher Education Amendments of 1998)*, Pub. L. No. 105-244, 2nd.
[10] U. S. Department of Education, *Meeting the Highly Qualified Teachers Challenge, the Secretary's Annual Report on Teacher Quality*, U.S. Department of Education, Office of Post Secondary Education and Office of Policy Planning and Innovation, 2002.
[11] *Elementary and Secondary Education Act of 1965 (No Child Left Behind Act of 2001)*, Pub. L. No. 107-110, 1st, January 8, 2002.
[12] Richard M. Ingersoll, "Misunderstanding the Problem of Out-of-Field Teaching," *Educational Researcher*, Vol. 30, No. 1, 2001, pp. 21-22.
[13] 22 Pa. Code § 354 (2007).
[14] National Council for Accreditation of Teacher Education, *Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education*, 2006.

the Teacher Education Accreditation Council (TEAC), was established in 1997.[15] Programs under consideration for TEAC accreditation must submit an inquiry brief that includes evidence of candidates' learning and understanding of subject matter knowledge and pedagogical skill. Both NCATE and TEAC also require programs to provide documentation that prospective teachers are able to use knowledge of content and pedagogy in their teaching.

5. The rapid expansion of alternate route programs.

Finally, there has been a tenfold increase in the number of individuals certified through alternate route programs over the last decade.[16] These alternative programs help provide access to the profession for nontraditional candidates, including those pursuing teaching as a second career. Alternate route programs were established for multiple reasons, including attracting academically strong candidates who did not want to go through formal teacher education programs.[17]

The current study investigates whether these policy initiatives are associated with changes in the academic quality and demographic characteristics of the potential teaching force. By comparing those who have taken *Praxis* tests in 2002–2005 with those who took *Praxis* tests in 1994–1997, this report addresses the following questions:

- *Has the demographic profile of* Praxis *test takers changed?*
- *Has the preparation of individuals entering the pool of* Praxis *test takers changed?*
- *Has the prior teaching experience of individuals taking the* Praxis *tests changed?*
- *Have there been changes in the proportion of individuals passing the* Praxis *tests?*
- *Have there been changes in the academic quality of individuals who pass the* Praxis *tests?*
- *To what extent are certain changes in the profile of* Praxis *test takers related to specific policy initiatives?*

Methodology

The basic methodology of this study is the same as that of the earlier study with two notable exceptions.[18] The earlier study matched *Praxis* test takers with their SAT or ACT test scores. Thanks to the cooperation of the College Board, the current study included SAT data. Unfortunately, however, data from ACT could not be obtained for the current study. Although it would have been preferable to have included the ACT data, the findings for the SAT- and ACT-matched cohorts were parallel in the earlier study, supporting the likelihood that the results are not greatly affected by the unavailability of ACT data.

The second major difference is that the earlier study included both *Praxis I* and *II* data. The *Praxis I* test measures basic skills in reading, writing, and mathematics and is most often used for admission into teacher education programs. However, the *Praxis I* test is used in very different ways across states. For example, the *Praxis I* test typically is waived for alternate route candidates and is also waived in some states for candidates who satisfy other academic criteria. The *Praxis II* test is used to measure knowledge of content, pedagogy, and content-specific pedagogy and is used to satisfy state licensure requirements. Required *Praxis II* tests are taken by all teacher candidates in a particular state — there are few, if any, exemptions. Therefore, this study only includes data from the *Praxis II* assessments. Throughout the rest of this report, all references to *Praxis* implies only *Praxis II* tests and test takers.

The data consisted of a merged file of all people who took at least one *Praxis* test during the academic years between 2002–2003 and 2004–2005 and for whom matching SAT scores from 1977 through 2002 could be found. A passing status (pass or fail) was assigned to each candidate for each *Praxis* test in each state. The passing score that was in effect in the state in which the candidate last tested was applied to each *Praxis* test taker for each *Praxis* test. Certainly, the fact that a candidate took a test in a particular state does not necessarily mean that the individual

[15] See www.teac.org.
[16] C. Emily Feistritzer et al., *Alternative Teacher Certification: A State-by-State Analysis 2006*: National Center for Education Information, 2006.
[17] Leo Klagholz, *Growing Better Teachers in the Garden State: New Jersey's "Alternate Route" to Teacher Certification*, Thomas B. Fordham Foundation, 2000.
[18] Gitomer, Latham, and Ziomek, 1999.

would seek to be licensed in that state. Given data on teacher mobility however,[19] testing locale is the most reasonable basis for determining which state's standard to apply in order to determine a test taker's pass-fail status. As with the prior study, the current study used the passing standard that was in force for the last year of the three-year sample. Thus, the state's 2005 passing standard was applied to all tests taken during this interval, even though standards for particular tests might have changed since 2002.

In many cases, states require candidates to take multiple *Praxis* tests to become licensed. For example, candidates might be required to take a content and content-pedagogy test in a specific subject area. Under such circumstances, candidates were considered to have "passed" if they passed *all* tests they had taken in a licensure area. For example, a candidate who took two *Praxis* mathematics tests had to pass both to be considered licensed in mathematics. A candidate who did not meet the passing standard on one or both tests was considered to have "failed." A candidate who passed all tests taken in a licensure area was considered to have passed even if the state required more tests for licensing than the candidate had taken during the three-year window for which the study had data. Candidates were deemed to have passed the test if they met the passing standard once, regardless if they took the test multiple times and did not succeed previously. In practical terms, these individuals would have met the state licensure test requirements and thus, were considered as "passers." Because how well candidates did on tests either prior to or subsequent to this three-year window could not be determined, the pass/fail classifications were based only on the tests actually taken between 2002 and 2005.

The creation of this data set enabled comparison of data from the 2002–2005 and 1994–1997 cohorts. However, because of the rapidly changing teacher-testing environment, it was necessary to determine how similar the two cohorts were. Two preliminary analyses were conducted.

Since 1997, many states have added *Praxis* requirements, and a few have dropped them. Because states' teaching-pool profiles differ significantly, only those states with substantial populations (n>500) of *Praxis* test takers who had SAT scores available were considered in order to make consistent and meaningful comparisons between the two cohorts. Twenty states[20] plus the District of Columbia[21] met this criterion. This provided the study with a sample size of approximately 153,000 *Praxis* candidates for the 2002–2005 cohort.

Second, to draw conclusions about the *Praxis* population, it was necessary to establish that the SAT-matched sample was representative of the entire *Praxis* population from these states. For each state included in the analysis, the characteristics of gender, race, language background, mother's education, undergraduate GPA, and prior teaching experience were compared. The sample was representative of the overall *Praxis* population.

Caveats and Limitations

In addition to the previous discussion of the limitations of using SAT scores as a proxy for teacher quality, the same caveats are provided here as those for the earlier study. First, although the *Praxis* test is widely used, it is not a test of a nationally representative group. Some states use non-*Praxis* tests for licensing, for example. Further, only a subset of states using *Praxis* tests was included in this study so that meaningful comparisons could me made over the two time periods. Nevertheless, the licensure data set is one of the most comprehensive available.

Another caution is that all background information is self-reported by the test takers, which may introduce bias. For example, the analyses by race/ethnicity would be skewed if candidates from one racial/ethnic group were less likely than others to identify their racial/ethnic background on the questionnaire. Because there was no clear way to identify erroneous or biased background data, no adjustments could be made.

[19] Donald Boyd, Hamilton Lankford, and Susanna Loeb, "The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools," *Journal of Policy Analysis and Management*, Vol. 24, No. 1, 2005, pp. 113-132.

[20] Arkansas, Connecticut, Hawaii, Indiana, Kansas, Kentucky, Louisiana, Maryland, Missouri, Mississippi, North Carolina, New Jersey, Nevada, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, and Virginia.

[21] While the District of Columbia is not a state, for purposes of this study as well as in terms of teacher licensure administrative responsibility, it is treated in the same way as a state.

It is also important to recognize the limitations of the *Praxis* tests. As program entrance and licensure tests, they measure knowledge considered essential to effective pedagogy. They are not designed to assess the full breadth of skills required of an effective teacher. Therefore, passing a *Praxis* test should not be interpreted to mean that an individual will necessarily become an effective, or even a satisfactory teacher. It does, however, warrant that the individual has acquired a level of knowledge that is acceptable for licensing a beginning teacher, and that teachers without this knowledge are unlikely to become effective teachers.

Finally, with some noted exceptions, it is generally impossible to ascribe particular changes in the teacher pool to specific policy initiatives. Because so many overlapping policies target teacher quality, it is extremely difficult to determine which policy led to which change. The goal of this study is to describe overarching trends in the quality of the teacher pool that have emerged in this policy environment, not to assign causality to particular policies.

The primary data reported are *Praxis* passing rates, undergraduate GPAs, and SAT scores for candidates with different demographic, preparation, and teaching experience backgrounds. Comparisons are drawn between the 1994–1997 and 2002–2005 cohorts to address the research questions enumerated above.[22]

Demographic Profile of the Pool of Prospective Teachers

There continues to be concern that the demographic makeup of the teaching force does not reflect the dramatic demographic changes that this country has experienced, particularly with respect to the K-12 student population. Some of the motivation for certain alternate route programs has been to increase the diversity of the teaching force. Other outreach efforts have also attempted to increase the number of prospective teachers coming from underrepresented groups.[23] The first question explored in this study is whether the demographic profile of prospective teachers has changed during this eight-year interval.

Figure 1 presents the proportion of male and female candidates across the two cohorts. Females continue to make up three-quarters of the candidate pool. These data provide no evidence that proportionately more men are seeking licensure now than previously.

Figure 2 presents results by racial/ethnic group, based on the 97 to 98 percent of all candidates who identify race/ethnicity in their *Praxis* information. The only notable change is a small increase in the relative proportion of Hispanic teachers, who continue to make up a very small share of candidates. Overall, the pool appears to be unchanged and overwhelmingly composed of White candidates. To put this in stark perspective, the percentages of African American, Hispanic, and Other *Praxis* candidates and K-12 public school students are compared in Table 1.

Figure 1

Percentage of* Praxis *Test Takers by Gender

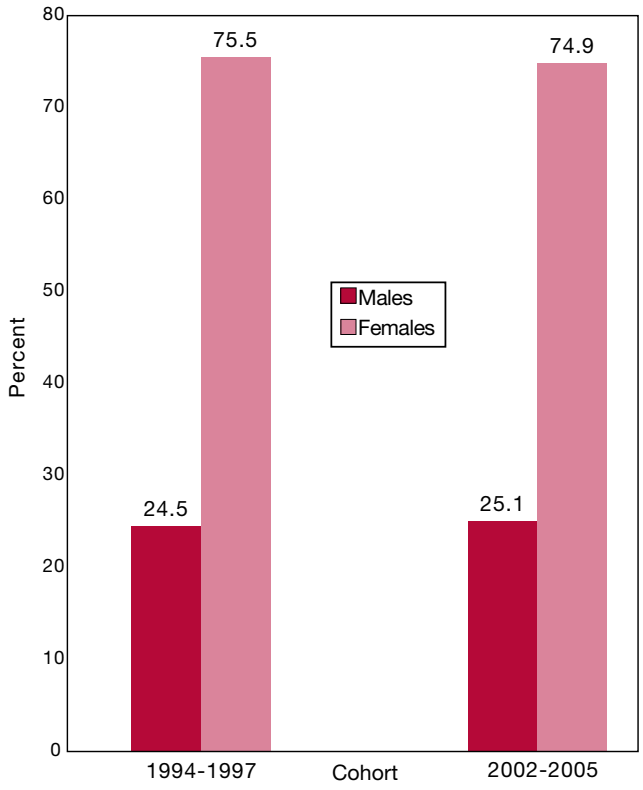


Table 1

Comparison of the Racial/Ethnic Diversity of* Praxis *Candidates and K-12 Population for 2003

Racial/Ethnic Group	*Praxis* Candidates	K-12 Public School Population
African American	8	16
Hispanic	3	19
White	88	58
Other	1	7

Source: Data for K-12 public school population are from National Center for Education Statistics, *The Condition of Education 2005*, U.S. Government Printing Office, 2005.

[22] Throughout this report, differences are reported at the .01 level. Effect sizes can be determined by dividing the mean difference being compared by the standard deviation of the SAT measures, which are approximately 112 points.

[23] Linda Brannan and Robert Reichardt, *Alternative Teacher Education: A Review of Selected Literature*, Mid-continent Research for Education and Learning/Western Interstate Commission for Higher Education, 2002.

Figure 2

***Percentage of* Praxis *Test Takers by Racial/Ethnic Group*[24]**

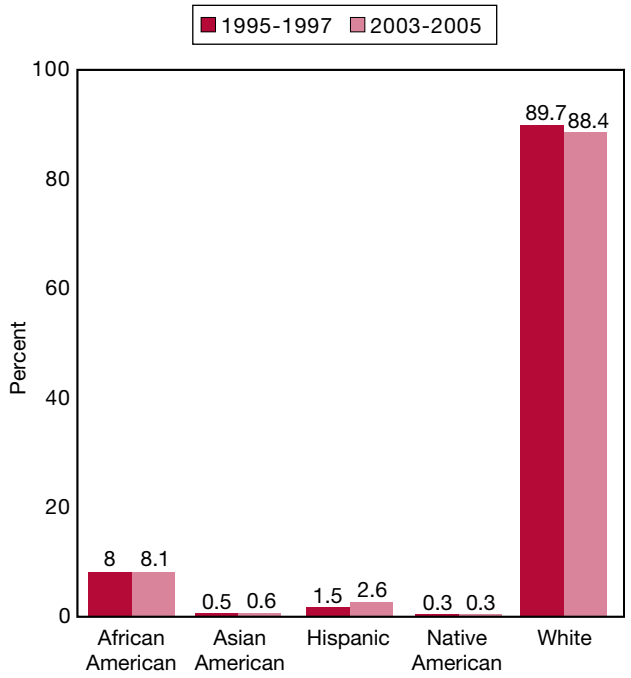
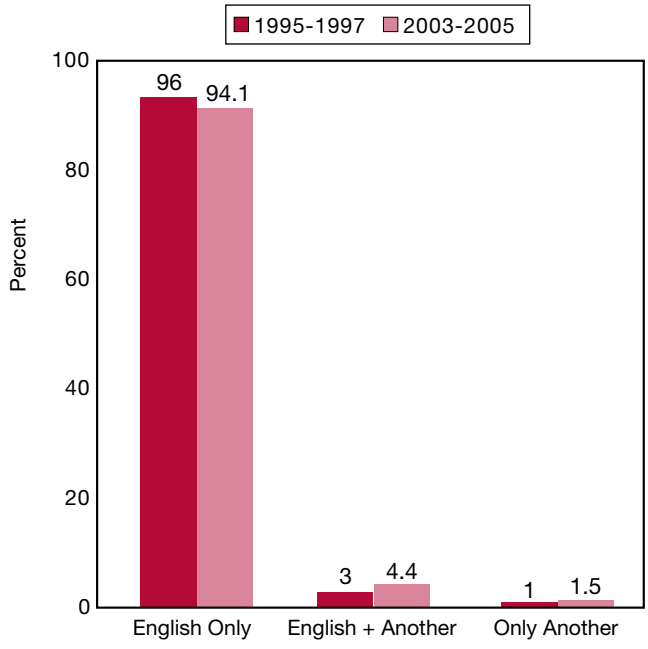


Figure 3

Percentage of* Praxis *Test Takers by First Language Learned



The proportion of non-native speakers of English in the student population is now 20 percent.[25] Figure 3 shows the proportion of teacher candidates who report learning English or another language as their first language. There is a very small increase in the proportion of candidates who report having first learned a language other than English.

Finally, mother's education was used as a proxy for the socioeconomic status of *Praxis* test takers. Figure 4 shows a slight increase in the percentage of candidates whose mothers had either an undergraduate or graduate degree. However, this increase may simply reflect the overall trend of increased college graduation rates for females.[26]

In summary, there appears to be relatively little change in the overall demographic characteristics of the prospective teaching pool. Prospective teachers continue to be predominantly White, female, and native English-speaking. Modest increases in mother's education level likely reflect general population trends.

Preparation of Individuals Entering the Pool of Prospective Teachers

Although the demographics of the two cohorts have remained much the same, it is important to see whether any changes have occurred during this eight year interval in the preparation of the pool. First, the study looked at the most common metric of college academic success, the undergraduate GPA.

[24] Over 97 percent of candidates provide race/ethnicity information. Percentages reported are adjusted as proportions of only those who provided specific race/ethnicity identification.

[25] National Center for Education Statistics, 2005.

[26] As a rough estimate, the graduation rates of females were compared from 1974 and 1982, an eight-year separation that was 20–23 years prior to the respective *Praxis* test. Indeed, during that interval, graduation rates for females increased 3.9 percent, from 10.1 to 14.0 (U.S. Census Bureau (http://www.census.gov/population/socdemo/education/cps2006/tabA-2.xls).

Figure 4

Mother's Educational Attainment of* Praxis *Test Takers

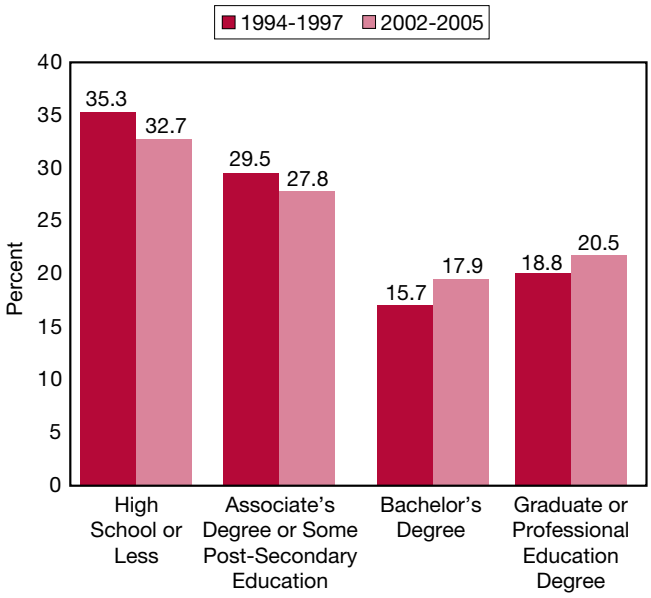


Figure 5

Undergraduate Grade Point Averages (GPA) of* Praxis *Test Takers

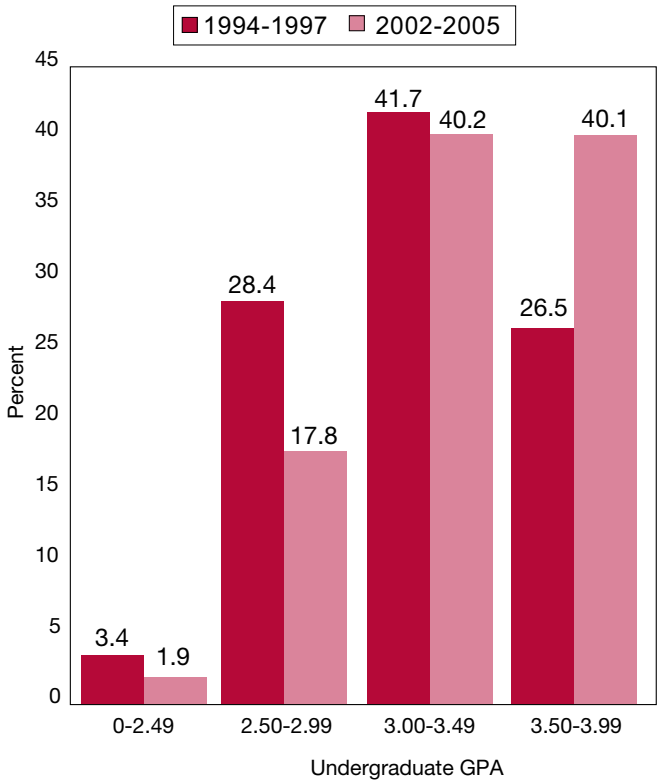


Figure 5 displays candidates' self-reported GPAs. *Praxis* candidates are asked to report from among a set of undergraduate GPA ranges. Among prospective teachers, the proportion of those with high GPAs increased while the proportion of those with lower GPAs declined. The percentage of candidates earning lower than a 3.0 GPA decreased from 32 percent to 20 percent for the two cohorts, while the percentage of earning higher than a 3.5 GPA increased from 27 percent to 40 percent. Thus, by this measure, we are witnessing a dramatic improvement in the quality of the teacher pool. It is important to verify this trend since grading expectations vary across institutions and academic departments and also because of the possibility of grade inflation. Further analyses correlating GPA with *Praxis* passing trends, and also with SAT scores, demonstrate that these improvements are not simply artifacts of grade inflation. As a result of higher admissions standards, the teaching profession is attracting students who meet higher academic standards as indicated by their college grades.

The analyses revealed another striking trend – the educational and professional history of the *Praxis* test takers had changed substantially. Most significant was the increase in the proportion of experienced teachers who have taken *Praxis* tests, apparently in response to NCLB and its HQT requirements. Presumably because of HQT, practicing teachers were required to take *Praxis* tests in order to be appropriately licensed. In order to properly interpret changes in the academic profile of those newly entering the teaching force from all *Praxis* test takers, many of this study's analyses disaggregate the results by those who have and do not have prior teaching experience. The candidate's prior teaching experience was determined by selecting one of three teaching status options: recently graduated and expect to begin teaching in the near future; 1 to 3 years teaching experience; and more than 3 years teaching experience.

The candidate's teacher education history was determined by how candidates responded to the question, "Are you or have you ever been enrolled in a teacher education program?" Options included Currently, Formerly, and Never. The assumption is that a large proportion of those who were never enrolled in a teacher education program are seeking certification through an alternate route. Finally, candidates were asked "How many years has it been since you attended college or graduate school?"

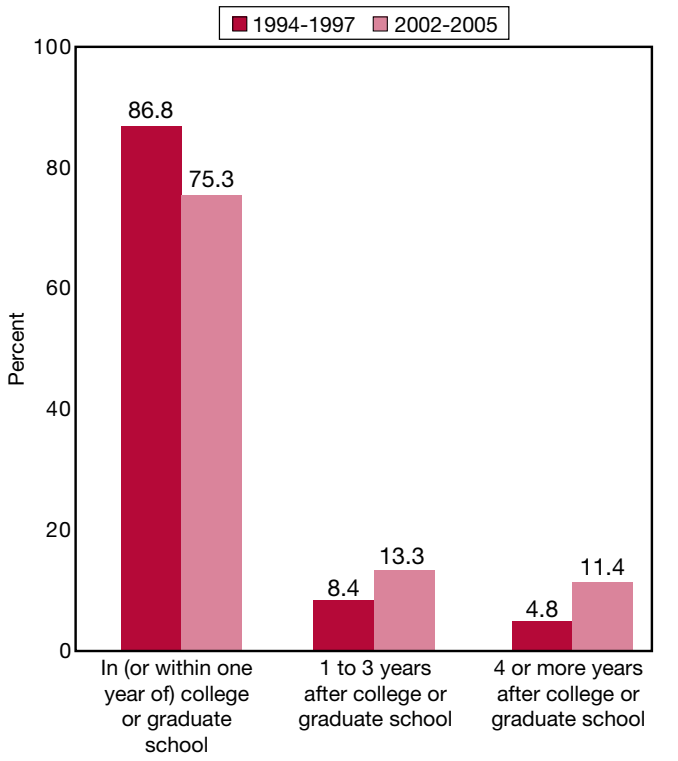
When were candidates taking *Praxis* tests? If experienced teachers were taking *Praxis* tests because of NCLB's HQT requirements, one would expect a larger number of test takers to be further removed in time from their college and graduate education. The emergence of alternate routes and the pursuit of teaching by career-changers might have had a similar impact.

Indeed, Figure 6 clearly shows the large changes that have occurred. The test takers are divided into three categories — those who took the *Praxis* tests either in college or graduate school or within one year of graduation, those who took the *Praxis* tests one to three years after completing college or graduate education, and those who took the *Praxis* tests four or more years after completing college or graduate education. Far more people took the *Praxis* tests at least one year after they had completed their education. There was an 11 percent drop between the two time cohorts in those who took the *Praxis* tests in or just after college and/or graduate school. In the more recent cohort, more than twice as many test takers had been out of school for at least four years before taking the test. Thus, fewer students appear to be following the traditional route of seeking licensure during or immediately after completing their educational program.[27]

These different patterns can be examined further by exploring the teacher preparation histories of candidates. The traditional model of teacher preparation was one in which a candidate attended a university-based teacher education program and completed licensure requirements during or soon after college or graduate education completion. However, there have always been *Praxis* candidates who took the test(s) subsequent to completing their teacher

Figure 6

Proximity of* Praxis *Test Taking to Education Completion



education programs. This might include teachers who moved from one state (non-*Praxis*) to another (*Praxis* required) or those who wanted to acquire an additional certification.

Figure 7 compares the proportion of test takers who took the *Praxis* tests who are currently in teacher education with those who were formerly in a teacher education program, and those who were never in a teacher education program. It is important to note that that this self-reported information may contain some significant measure of uncertainty. Many alternate route programs, for example, are offered through established teacher education programs and thus, candidates may be interpreting the question differently. Nevertheless, the same question was asked of both cohorts, and while the majority of teacher candidates continue to come through teacher

[27] To ensure that these differences were not reflective of general societal trends to attend graduate school later in life, average ages of graduate students were examined from 1996 and 2004 in the Baccalaureate and Beyond Survey (NCES). The mean age of students did not change between these years.

education programs, the proportion who report they do not is increasing.

The changes in teacher characteristics observed in this study coincide with policy shifts that seem likely to have caused at least part of the observed trends. During the eight-year interval, fewer candidates reported that they were currently in teacher education programs, and more candidates reported that they had never been part of a teacher education program. Much of this increase is likely due to the increase in alternate route opportunities. There is also an increase in the number of candidates who report they were formerly enrolled in teacher education programs. This increase may be related to NCLB's requirement that current teachers be subject-matter certified and move to full certification from emergency certification.

Indeed, the tendency for those already teaching to be taking the *Praxis* tests becomes even more apparent in Figure 8. The proportion of candidates with teaching experience taking the *Praxis* tests has nearly doubled.

Who are these experienced teachers? Most likely they are practicing teachers who required additional licensing due to NCLB requirements. Figure 9 displays the proportion of experienced candidates in relation to their teacher education history. Regardless of teacher education status, there is an increase across the two cohorts in the percentage of those taking the *Praxis* tests who are experienced.

For those taking the *Praxis* tests who were formerly in a teacher education program, almost two thirds have prior teaching experience. Undoubtedly, this category includes individuals who may have taught in one state and then needed to pass licensure tests after relocating to another state. There is no reason to believe, however, that the number of teachers moving across states has increased substantially during the last eight years. Rather, the large increase in teachers with experience is most likely attributable to NCLB and the testing of already practicing teachers.

Figure 7

Percentage of* Praxis *Test Takers by Teacher Education Status

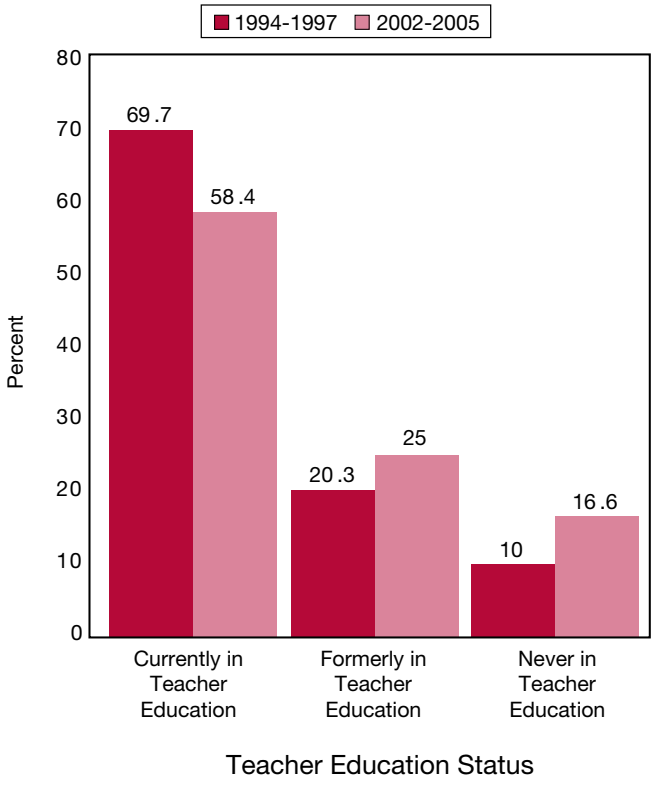


Figure 8

Percentage of* Praxis *Test Takers by Teaching Experience

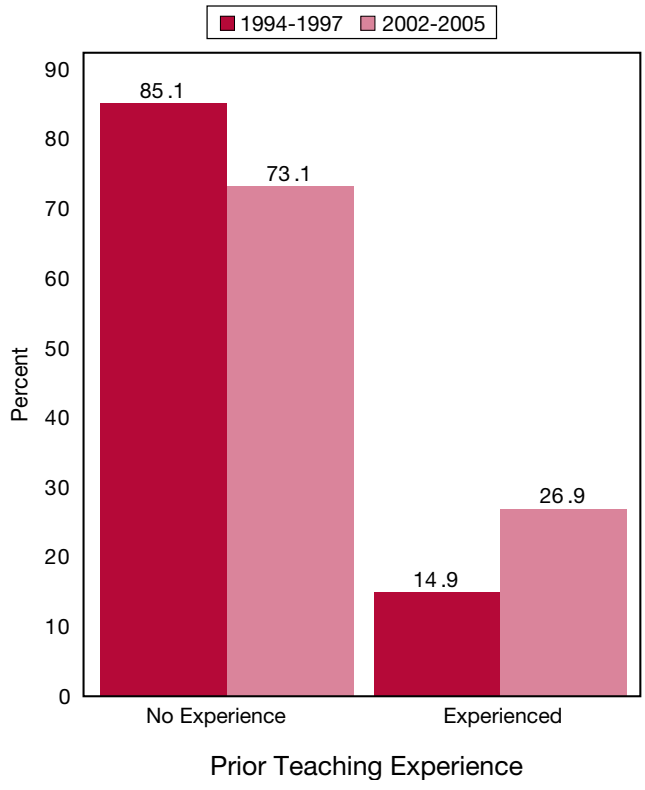
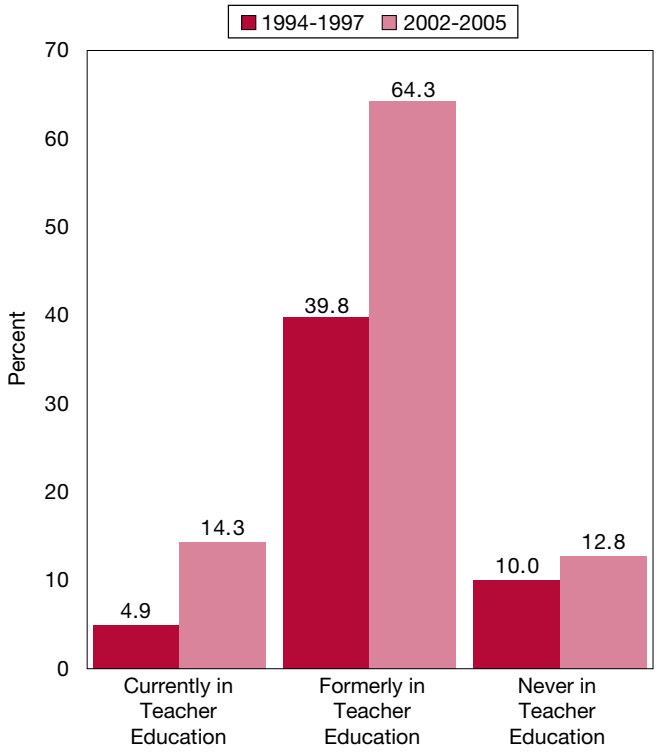


Figure 9

Percentage of* Praxis *Test Takers with Prior Experience by Teacher Education Status



What is the educational background of these experienced teachers? Schools facing the most difficult socioeconomic circumstances have also been more likely than other schools to employ teachers with emergency licenses, and minority teachers are more likely to be teaching in these schools.[28] And indeed, results in the current study are consistent with these findings.

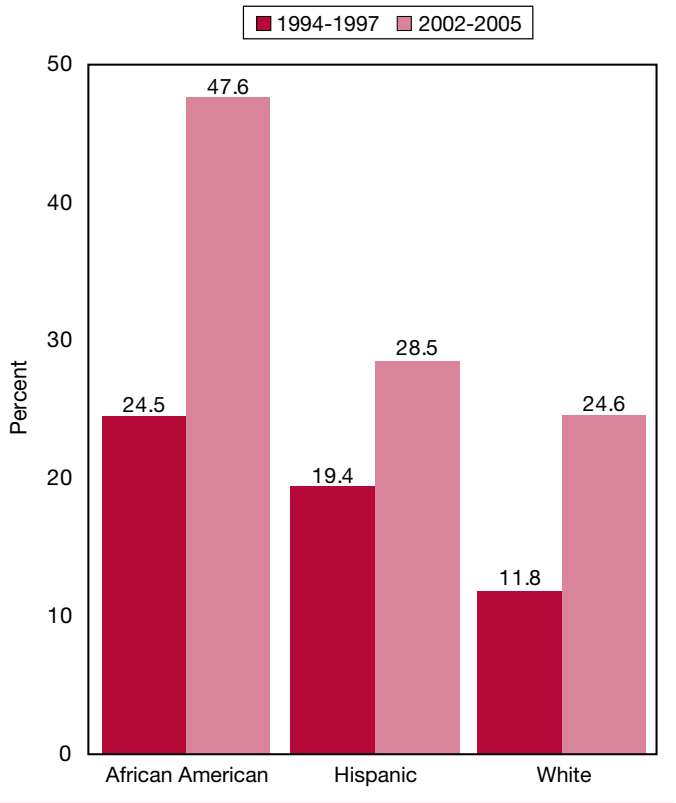
Teaching experience at the time of taking the *Praxis* tests varies quite substantially across demographic groups. Figure 10 provides teacher experience data for African American, Hispanic, and White candidates. For all three groups, there are significant increases in the proportion of candidates with teaching experience taking the *Praxis* tests, but the differences across groups are striking. Among African Americans in the more recent cohort, almost half have prior teaching experience. Even in the earlier cohort, there are far more African American candidates with teaching experience than in the other two groups.

While this trend will be examined in further research, all indications are that these group differences reflect the higher relative proportion of African American teachers who have entered the teaching field with emergency certification, most typically in hard-to-staff schools. Under state, and now federal regulations, these teachers are required to seek permanent licensing status. The data indicate that the vast majority of these experienced minority teachers are elementary and special-education teachers.

In summary, for the states covered in this study, there are some very notable changes in the educational and prior teaching histories of people taking the *Praxis* test. More recent candidates have stronger undergraduate GPAs than their predecessors. In the recent study

Figure 10

Percentage of* Praxis *Test Takers with Prior Teaching Experience by Racial/Ethnic Group



[28] Ingersoll, 2001.

cohort, candidates are more likely to take the *Praxis* tests well after they have completed their college careers. Certainly, a larger proportion of candidates new to the field of teaching are now pursuing teaching through alternative routes. Increasing proportions of *Praxis* candidates have prior teaching experience, particularly individuals who were formerly in university-based teacher preparation programs. Finally, African American candidates are much more likely to have had prior teaching experience.

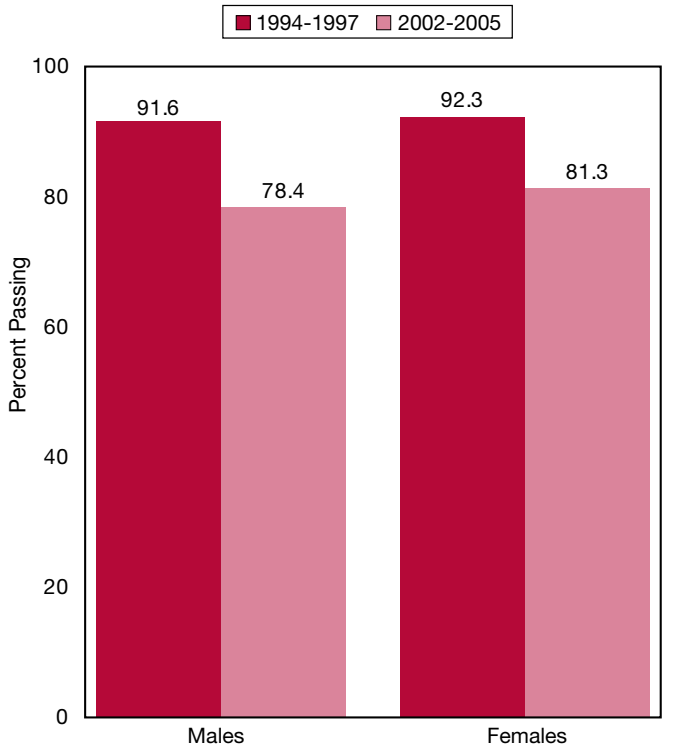
Passing Rates and the Academic Quality of *Praxis* Candidates

To investigate this issue, this study first identified individuals who passed the *Praxis* tests. The ultimate impact of any policies on the teaching force will be determined by the characteristics of those who are licensed to teach. Only those who pass the *Praxis* tests are eligible to teach in public schools in their respective states. Therefore, it is important to understand whether passing rates have changed, and also to compare those who pass with those who do not.

As described earlier, candidates were considered to have passed the *Praxis* tests if they had at least one passing score for each of the tests they had taken within a particular licensing area during the 2002–2005 timeframe. For example, they were considered to be in the "passed" category for this study if they had met their state's requirement for all *Praxis* tests they had taken in a licensing field.[29] If they did not meet the state passing score on one or more tests in that licensing field, then they were assigned a not-passing status.

Figure 11 presents the passing rates for the two cohorts by gender. The overall proportion of those in the "passing" category has decreased from 92 percent to 80.5 percent. For both males and females, the overall passing rate is considerably lower for the more recent cohort, and the decrease is slightly more for male students. These decreases are also evident for all racial/ethnic groups, as shown in Figure 12. The steepest drop is for African American candidates, from 74.4 percent in the earlier cohort to 52.1 percent in the more recent cohort.

Figure 11
Praxis *Passing Rates by Gender*



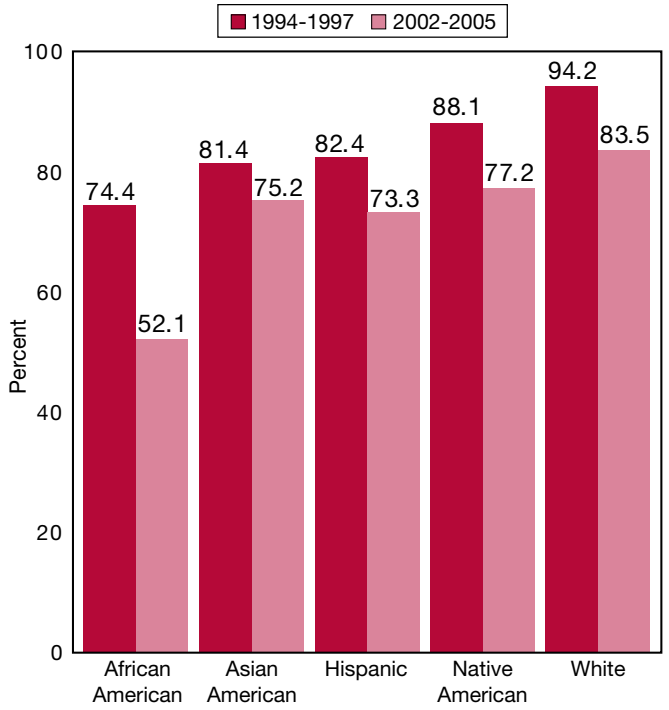
These recent passing rates may appear lower than the rates that have been reported by institutions and states as part of their required Title II reporting.[30] Remember that Figure 11 reports data for all *Praxis* test takers, not just those designated as being program completers, as required by the Title II legislation. As noted earlier, due to Title II legislation, many teacher education programs predicate admission upon success on *Praxis* tests.

There are two possible explanations for the relatively large decrease in passing rates. One possibility is that the candidate pool is weaker academically, or at least less well-prepared to take the *Praxis* tests. The second possibility is that states have imposed higher passing requirements.

[29] Including general pedagogy tests if required for a license in the field.
[30] U.S. Department of Education, Office of Post Secondary Education, and Office of Policy Planning and Innovation, 2002.

Figure 12

Praxis *Passing Rates by Racial/Ethnic Group*



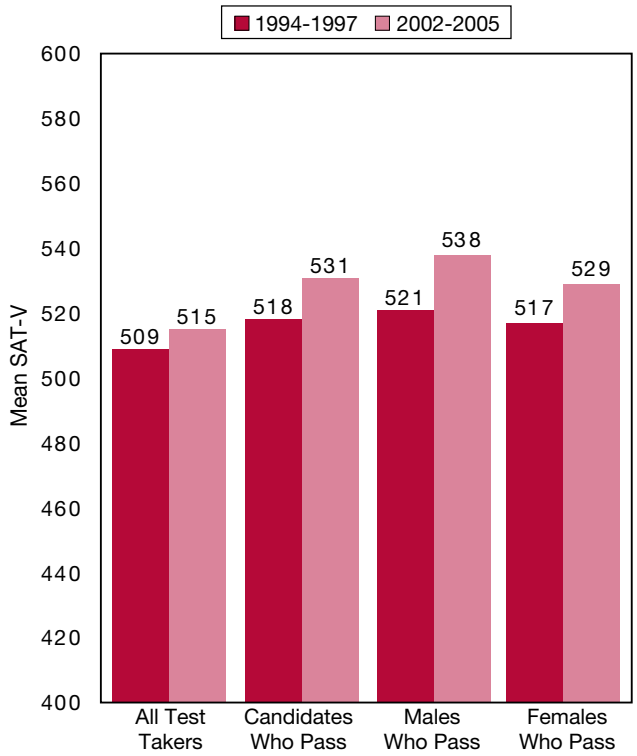
To test the hypothesis that the candidate pool is weaker, both SAT scores and undergraduate GPAs of *Praxis* test takers were examined. Figure 13 displays SAT scores for the two cohorts. The first set of bars shows that SAT-Verbal scores for all *Praxis* candidates have increased 6 points. More importantly, there is a 13-point gain for those who pass *Praxis* tests, with male students showing a somewhat larger increase than female students. In Figure 14, increases are also evident for all racial/ethnic groups, most especially African American and Native American students. As found in the earlier research study, licensure testing does filter out individuals with weaker academic histories.[31]

To put these changes in perspective, it is important to understand whether these observed increases in SAT scores reflect changes in the general population or are specific to teacher candidates. For both cohorts, SAT scores going back to 1977 were obtained. The study looked at what would be the expected change in SAT-V scores[32] in the general population for any eight-year period between 1977 and 2002, the years in which the individuals included in this study would most likely have taken the SAT. The difference in mean SAT scores for eight-year periods (e.g., 1977 vs. 1985, 1978 vs. 1986) was averaged, and it was found that verbal scores have been essentially unchanged. That is, the expected gain over any selected eight-year period is zero. Therefore, the changes found in this study are statistically significant and large relative to observed year-to-year changes in an instrument as stable as the SAT.

Math scores have also increased substantially and are presented in Figure 15. However, math SAT scores in the college-bound senior population have risen over the last 20 years. From the college-bound senior data one might expect, in any eight-year time span, an increase of about eight points. Thus, the average gain of 17 points observed for those who pass *Praxis* tests also exceeds the general SAT population increase.

Figure 13

SAT Verbal Scores for* Praxis *Test Takers



[31] Gitomer, Latham, and Ziomek, 1999.
[32] Recentering of the SAT in 1995 was taken into account for all these analyses.

Figure 14

SAT Verbal Scores by Racial/Ethnic Group for Those Who Pass* Praxis *Tests

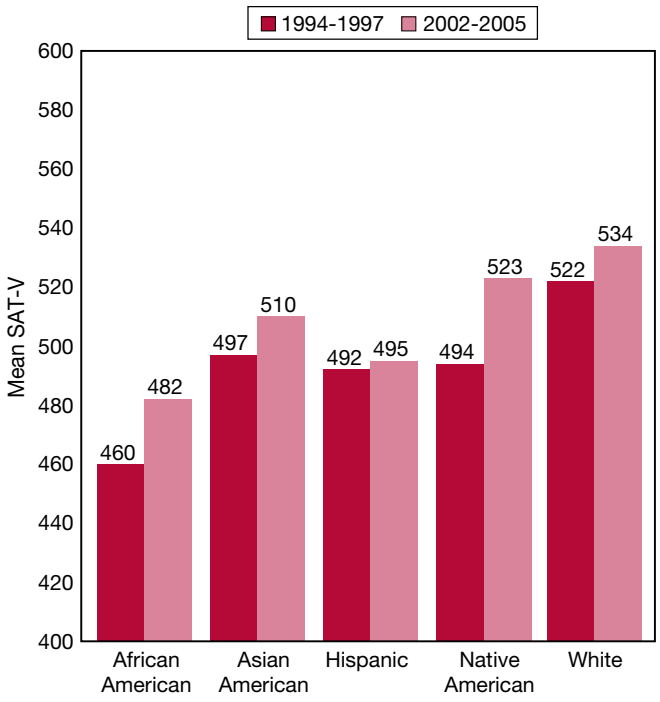
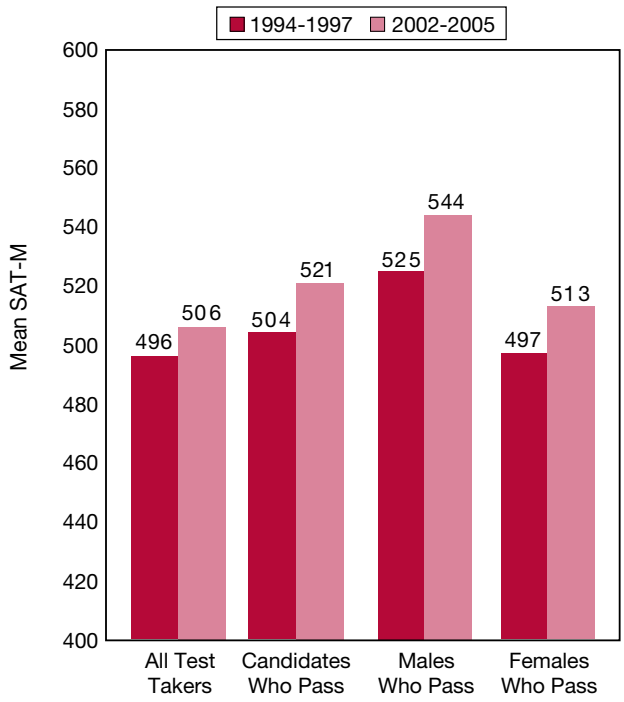


Figure 15

SAT Math Scores for* Praxis *Test Takers



For those who pass *Praxis tests*, increases are evident for male and female students as well as for all racial/ethnic groups, particularly African American students (Figure 16). Despite the increases, White and Asian students continue to earn higher scores than African American, Native American, and Hispanic *Praxis* test takers.

Are increases in SAT scores related to other indicators of academic preparation? Figures 17 and 18 demonstrate the very strong and consistent relationship between SAT scores and UGPA for both cohorts. Thus, the self-reported data on UGPA presented in Figure 5 appear to reflect real changes in the increased academic quality of prospective teachers. Even within the same grade ranges, SAT scores have crept up, making any arguments about grade inflation within this time frame even more questionable.

Grades, like SAT scores, are related to the likelihood of passing *Praxis* tests. Grades are very strong predictors of passing rates in both cohorts, as presented in Figure 19. The converging patterns of grades, passing rates, and SAT scores suggest that the improvement in undergraduate GPAs over this eight-year span reflects real improvement rather than grade inflation.[33]

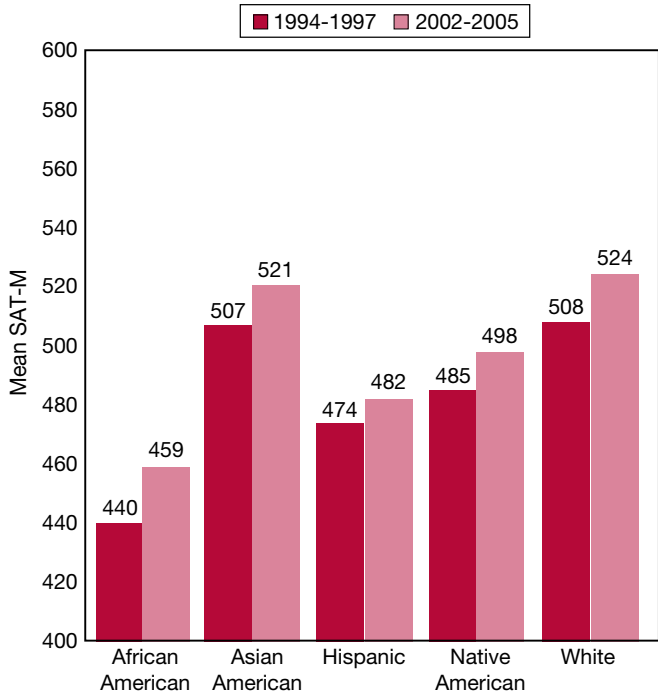
To this point, only summary data for the overall group of teachers have been reported. However, the earlier research study clearly demonstrated that the academic profile of elementary, special, and physical education teachers was quite different from the profile of teachers who were certified in particular subject areas (i.e., secondary licensure).

Figures 20 and 21 present average SAT verbal and mathematics scores by licensure area for the two

[33] For a review of the historically strong relationship between grades and SAT scores, see Warren W. Willingham, Charles Lewis, Rick Morgan, and Leonard Ramist, "Predicting College Grades: An Analysis of Institutional Trends Over Two Decades," *The Journal of Higher Education*, Vol. 64, No. 1, pp. 112-115, 1990.

Figure 16

SAT Math Scores by Racial/Ethnic Group for Those Who Pass* Praxis *Tests



cohorts. The horizontal line in each figure represents the average SAT score for all college graduates (who took the SAT) used in the earlier research study.[34] These measures are from the Baccalaureate and Beyond survey based on college graduates in the 1992-93 academic year.[35]

The relative profile across licensing areas has remained steady. Those licensed in secondary subject areas continue to have verbal SAT scores at least as strong as those of national college graduates who took the SAT. Math SAT scores for those licensed in mathematics and science are well above those for other college graduates.

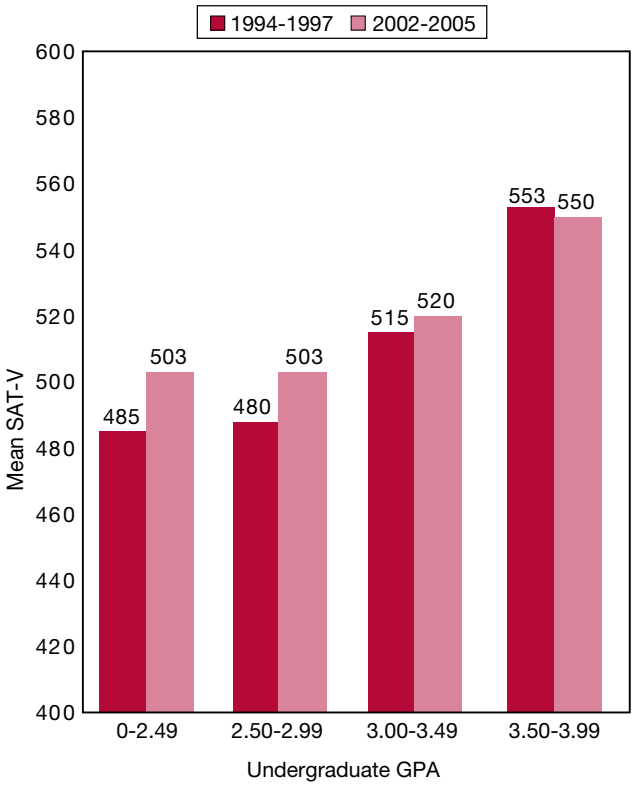
For almost all fields, there is an increase in scores between the two cohorts. Notably, there are very meaningful gains in elementary education, an area of concern to many. However, the scores of elementary education candidates, as well as those in special and physical education continue to lag well behind those of other college graduates and those licensed in secondary subjects.

Given these data on grades and SAT scores, the decrease in passing rates is not likely the result of a diminution of quality in the cohort of those taking *Praxis* tests. The overall pool of test takers, but most especially those passing *Praxis* tests, appears to be stronger eight years later. Therefore, an alternative explanation is that licensing requirements have become more challenging.

There are two ways in which requirements can become more difficult. First, states can raise passing scores for the

Figure 17

The Relationship of SAT Verbal Scores to Undergraduate GPA for* Praxis *Test Takers



[34] National Center for Education Statistics, *Teacher Quality: A Report on Teacher Preparation and Qualifications of Public School Teachers*, U.S. Department of Education, Office of Educational Research and Improvement, 1999.

[35] National Center for Education Statistics, Baccalaureate and Beyond Data Analysis System, http://nces.ed.gov/dasolv2/tables/index.asp#pse_students, 2007.

Figure 18

The Relationship of SAT Math Scores to Undergraduate GPA for* Praxis *Test Takers

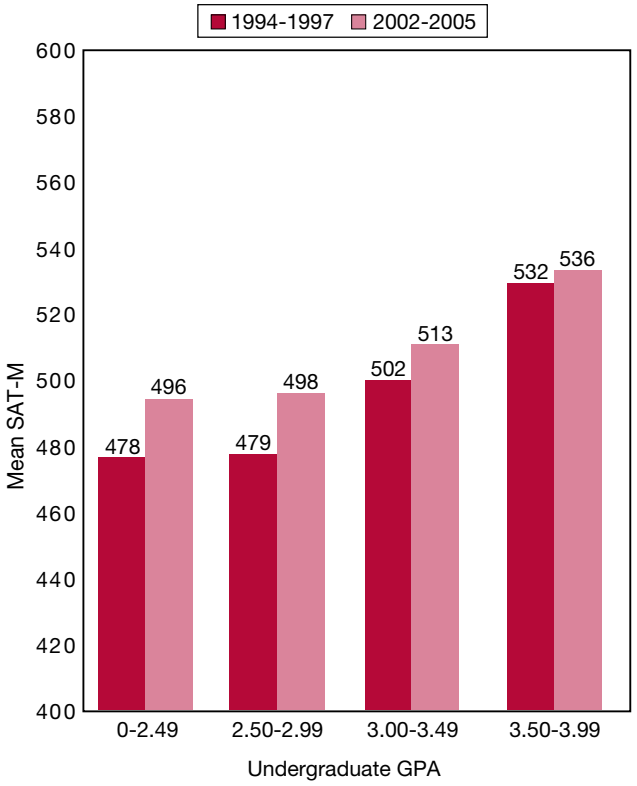
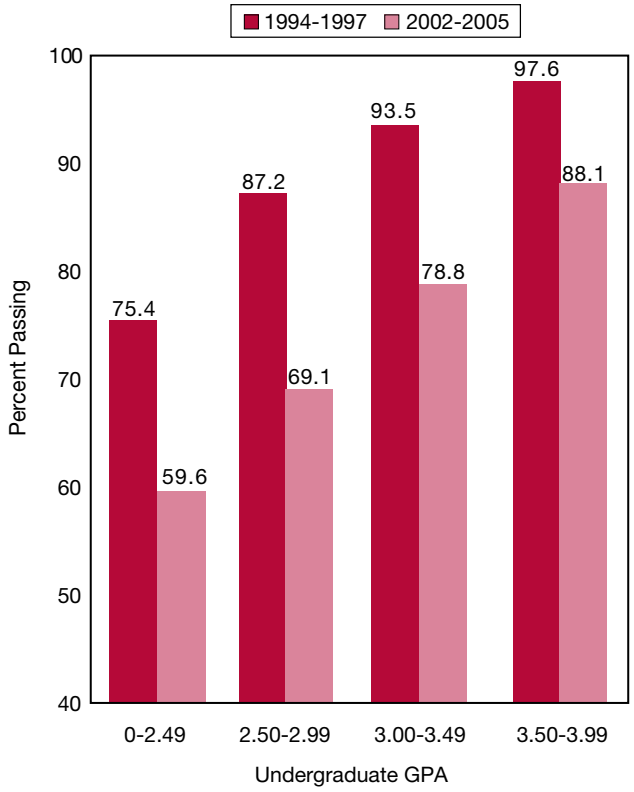


Figure 19

Undergraduate GPA and Percentage Passing* Praxis *Tests



same tests, making it more difficult to achieve licensure. Second, states can select different tests they use for licensure. Each of these hypotheses was considered.

Table 2 compares state testing requirements in 1997 and 2005 for the states included in this study. The first three columns report score requirement changes (raise, same, lower) when the same tests were used. The last column reports on the number of states in which the tests that were used to become licensed actually changed.

Between 1997 and 2005, some states did indeed raise passing scores, but for the most part, passing scores did not dramatically change when the same test was used. However, far more frequently, states went through a transition process during these years, adopting new, and/or additional, licensure tests.

In fact, depending on the licensure area, between one half and two thirds of the states in this sample made some change in the tests used for the licensing decision. These new tests were developed and adopted in response to the educational standards movement that emerged during the 1980s.

In 1992, Educational Testing Service (ETS) introduced a new series of assessments, known as *The Praxis Series*™.[36] These assessments were designed around modern theories of teaching. They made clear distinctions between content knowledge, content-specific pedagogy, and general teaching knowledge. Thus, states might choose between one and three tests to satisfy requirements for a particular license.

[36] Carol A. Dwyer and Ana Maria Villegas, *Guiding Conceptions and Assessment Principles for The Praxis Series: Professional Assessment for Beginning Teachers®*, Educational Testing Service, 1993.

Figure 20

SAT Verbal Scores by Licensing Area for Those Passing* Praxis *Tests

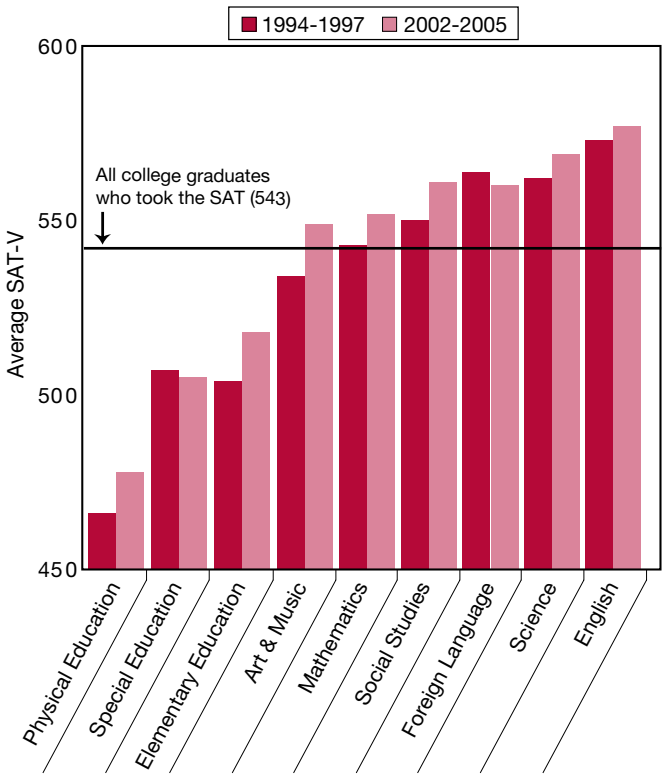


Figure 21

SAT Math Scores by Licensing Area for Those Passing* Praxis *Tests

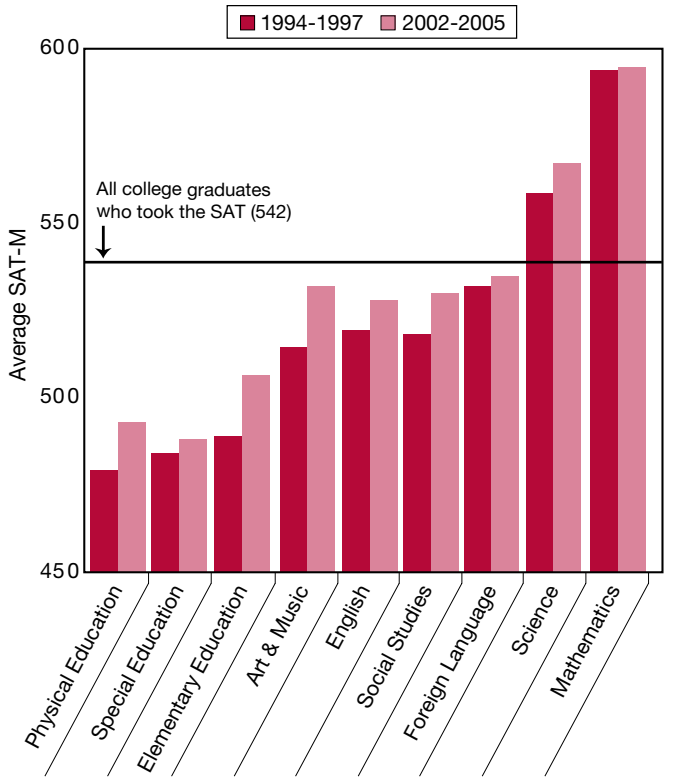


Table 2

Changes in* Praxis *Requirements 1997–2005 for 20 States and the District of Columbia

	State Action			
Licensure Area	Passing Score Lower	Passing Score Same	Passing Score Higher	Change in Tests Required
Elementary	0	5	1	15
Mathematics	1	2	4	14
Science	1	7	3	10
English	1	3	7	10
Social Studies	0	4	3	14

Source: Based on author's comparison of state requirements contained in *Praxis* program publications, 1997 and 2005.

The Praxis Series replaced the National Teacher Examination (NTE) system that was introduced in the 1930s. The NTE tests focused almost exclusively on content and were relatively disconnected from modern theories of teaching and learning. They were based primarily on surveys of teacher education curricula. While the exact records are murky, it appears that the last serious design of major NTE tests occurred sometime during the 1970s.

When *The Praxis Series* was instituted in 1993, states began to adopt *Praxis* tests to replace the older

NTE tests. ETS, the developer of both the *Praxis* and NTE tests, moved all of the NTE tests under the *Praxis* umbrella during the transition phase. However, the complete transition took longer than expected, so that even in 1997, many states still were using NTE tests. The post-1997 change from the NTE to the *Praxis* test is shown in the last column of Table 2. Not only did candidates now have to take content tests that were grounded in modern conceptions of teaching and learning, many were now required to take content-specific pedagogy and general pedagogical tests. The new standards-based *Praxis* assessments created a more rigorous screen for candidates into the profession.

In summary, the following can be said about overall licensure patterns and academic quality during the last decade, at least for the states included in this study:

- Passing rates have decreased substantially.
- The academic profile of the entire candidate pool has improved.
- The academic profile of those passing the *Praxis* tests has improved.
- These improvements are consistent across gender, race/ethnicity, and licensure area.
- Profiles are markedly different for secondary subject teachers in contrast to elementary, special education, and physical education teachers.
- The decrease in passing rates is likely attributable to increasingly demanding testing requirements put in place during these intervening years.

Taken together, these findings suggest that recent policy initiatives have helped improve teacher quality as measured by SAT scores and reported college grades. In most cases however, it is difficult to assign particular changes to specific policies because the initiatives have been implemented at so many points in the system. The observed changes are large for the world of education policy and have occurred over a relatively brief time span. This confluence of policy changes at the institutional, state, and federal levels is associated with a changing profile of prospective teachers.

Effect of Highly Qualified Teacher (HQT) Provisions and Alternate Routes to Teaching on the Teaching Pool

It is possible, however, to infer that certain trends in teacher certification are attributable to single policies, particularly the HQT of NCLB. We earlier identified the upsurge in experienced teachers taking licensure tests. HQT mandated that by 2005–2006, teachers could no longer be on emergency licenses that postponed or waived state licensing requirements. HQT also mandated that all teachers demonstrate content knowledge in the subject areas in which they teach. In most states, content knowledge can be demonstrated either through substantial college coursework or through successful performance on a rigorous subject-matter test (i.e., tests for teacher licensure). The implications are clear — many teachers who did not meet HQT needed to take the *Praxis* test despite the fact that they were already in the classroom. And, because so many middle-school teachers did not have content-area expertise and had only elementary licenses,[37] this group was disproportionately affected by HQT.

The second policy that has had a demonstrable impact on the teaching pool is the rapid expansion of alternative pathways to teacher licensing in states across the country. Although the available data cannot identify alternate route candidates, it can be inferred that many candidates who report that they have never been in teacher education and do not have prior teaching experience are pursuing alternate routes. Although this is an imperfect measure, the same question was asked of individuals in both cohorts. As shown in Figure 7, there was a 66 percent increase in this category over the eight years. Given other data regarding the growth of alternate routes,[38] it is reasonable to attribute to this path to teaching the increase in those reporting they have never been part of a teacher education program.

In sketching the changing faces of *Praxis* test takers, we considered issues related to the characteristics of those entering the teaching force. One question concerns the relative qualifications of prospective teachers who entered teaching through traditional routes during the two time periods defined by these

[37] Craig Jerald and Richard M. Ingersoll, *All Talk, No Action: Putting an End to Out-of-Field Teaching*, The Education Trust, 2002.
[38] C. Emily Feistritzer, *Alternative Teacher Certification: A State-by-State Analysis 2007*, National Center for Education Information, 2007.

two cohorts. Results are presented in Table 3. There has been a large decrease in the proportion of *Praxis* test takers who fit the traditional model of an individual studying in a teacher education program and then moving into teaching without any prior teaching experience. Although the *Praxis* passing rate is lower for the more recent cohort, their verbal and mathematics SAT scores are higher than those of the earlier cohort.

Table 3

Praxis *Test Takers Currently in Teacher Education with no Prior Teaching Experience*

	1994–1997	2002–2005
Percent of Pool	66.3	49.9
Passing Rate	95.4	86.0
SAT Verbal*	522	532
SAT Mathematics*	508	524

* Of those passing *Praxis*

A second question is how "newcomer" teachers compare to their more seasoned peers. Newcomers are defined as those without any teaching experience who are currently in teacher education programs as well as those who appear to have traversed alternate routes. Newcomers are compared with those who have prior teaching experience, whether having been in a teacher education program or not. Although the group of experienced teachers undoubtedly includes fully certified teachers who have moved into a state that requires *Praxis* scores from a non-*Praxis* state, the near doubling of *Praxis* candidates with teaching experience (see Figure 8) is most likely due to HQT requirements. Because NCLB was enacted after the first cohort, only data from 2002–2005 was included in this part of the study.

Table 4 shows that newcomers from teacher education programs have higher passing rates than the other three groups. SAT scores are reported for those who pass the licensure tests. Alternate route newcomers have slightly higher SAT scores than teacher education newcomers, but both groups outperform those who have teaching experience and who have a teacher education history. A relatively small proportion of test takers have teacher experience but no teacher education program. Those who pass the *Praxis* test with this profile have relatively high SAT scores. However, this group also had the lowest passing rates. Indeed, those with this profile who did not pass the *Praxis* test have the lowest SAT scores of any comparison group of non-passers.

Combining the data presented in Tables 3 and 4 suggests that candidates who graduate from teacher education programs are academically stronger than in years past. Those who report not having gone through a teacher education program are similarly strong, with slightly higher SAT scores and lower passing rates. However, regardless of preparation pathway, newcomers are academically stronger than those who have already had teaching experience when they took the *Praxis* test. Of course, experienced teachers who took the *Praxis* test are not representative of all experienced teachers. They represent a subset of experienced teachers who were required to take the licensure test for one reason or another.

Table 4

Comparison of Newcomer and Experienced* Praxis *Test Takers by Type of Preparation Pathway

	Newcomer – Teacher Education Program	Newcomer – Never in Teacher Education (Alternate Route)	Experienced — Current or Former Teacher Education Program	Experienced – Never in Teacher Education
Percentage of Test Taker Pool	49.9	14.1	24.4	2.3
Percent Passing	86.0	78.1	75.0	70.9
SAT Verbal*	532	536	525	537
SAT Mathematics*	524	527	510	524

* Of those passing *Praxis*

Table 5

The Changing Profile of* Praxis *Mathematics Test Takers by Undergraduate Major

	Mathematics	Math Education	Elementary Education	Other Majors
Percent of Pool 1994–1997	43.6	34.3	5.5	16.5
Percent of Pool 2002–2005	24.4	13.1	34.1	29.7
Passing Rate 1994–1997	86.6	89.3	53.9	76.6
Passing Rate 2002–2005	62.8	64.6	69.7	65.2
SAT-M 1994–1997*	604	581	589	618
SAT-M 2002–2005*	628	612	558	613

* Of those passing *Praxis*

Effect of HQT on Certification of Middle-School Teachers

HQT mandates that all teachers who teach specific content need to demonstrate expertise in that area. Elementary teachers were generally unaffected by this provision because they tend to teach multiple subjects in self-contained classrooms, and have a specific license to do so. Secondary subject teachers were not affected either if they were already licensed in the subjects they were teaching, such as English or math. The biggest impact was on middle-school teachers, many of whom taught specific subjects like English and math in separate classrooms, even though they had the same licenses as elementary teachers. Looking within specific licensing fields and school levels, one is able to better discern how HQT is associated with licensing trends for different cohorts of teachers.

For purposes of this study, only mathematics is examined, but the results are consistent across all major content areas. The first rows in Table 5 compare undergraduate majors for those who receive mathematics certification. Teacher preparation has shifted dramatically. While only about 6 percent were elementary education majors in 1994–1997, 34 percent of those certified in math were elementary education majors in 2002–2005. Similarly, 78 percent of candidates in the earlier cohort reported majoring in either mathematics or math education, compared to 38 percent in the more recent cohort. This may seem surprising given the call for more rigorous preparation and the phasing out of the education major in many states in favor of a content major.

The next two rows of data in Table 5 seem even more puzzling. It would be reasonable to expect that those who have studied and majored in mathematics would perform better on math licensure tests than those with other majors. That pattern is exactly what is observed for 1994–1997. However, for the 2002–2005 cohort, elementary education majors have the highest passing rates. Yet elementary majors who passed the licensure tests had SAT scores that were much lower than those who majored in math and/or math education.

The explanation for this apparent anomaly may be that in response to NCLB many states have adopted new *Praxis* tests that assess middle-school instructors' knowledge of the subject they plan to teach. These tests satisfy the NCLB HQT requirements for middle school teachers in specific subject areas. In most states, middle school teachers have the option of taking either the middle school test or the secondary test. Approximately half of candidates who were licensed in mathematics between 2002 and 2005 were taking these middle-school assessments.

As seen in Table 6, the characteristics of individuals taking the middle-school assessments are quite different from those who take the *Praxis* secondary subject certification tests. The middle-school group is much more likely to have teaching experience and to have been enrolled in a teacher education program. No doubt, this reflects the impact of HQT on practicing teachers. The middle-school test takers are also much more likely to be female education majors with lower SAT scores. In sum, they have profiles that are similar to elementary teachers.

It is clear that the middle-school and secondary subject certifications are attracting different kinds of individuals and that the subject matter depth required in the secondary subject-specific assessments is likely to be more demanding than for the middle-school subject-specific assessments. For instance, the secondary subject licensure test includes questions covering

Table 6

Characteristics of Middle-School* Praxis *Test Takers, 2002–2005, by Type of Licensure

	Secondary Subjects Licensure	Middle-school Licensure
Percent of Licensures in Mathematics	48.8	51.2
Percent Female	52.8	70.7
Percent with Teaching Experience	20.7	48.7
Percent Formerly in Teacher Education	16.3	44.7
Percent Math or Math Education Majors	68.6	4.2
Percent Elementary Education Majors	4.8	63.0
SAT-M*	632	564

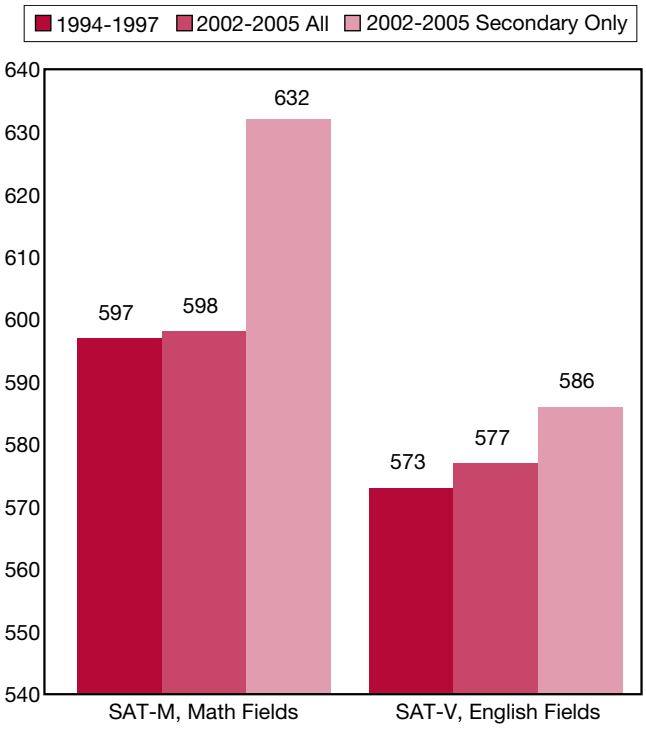
* Of those passing *Praxis*

trigonometry, calculus, and matrix algebra, areas not addressed in the middle-school assessment. Despite the HQT requirements, there remains a divide in academic quality and subject-matter training between those who obtain secondary subject certifications and those who seek middle-school certification. Even though both groups meet HQT requirements, they are attempting to meet different standards and expectations with respect to content knowledge of mathematics.

These data also indicate that cohort gains in SAT scores are likely to be even more substantial than previously described, especially for secondary subject teachers. When the data are examined separately for middle-school and secondary subject test takers, the net improvements are even greater than previously presented. Figure 22 shows that the SAT-Math scores for those who took the secondary subject tests actually increased by 35 points from the earlier cohort. Secondary subject test takers licensed in English had SAT-Verbal scores that were 13 points higher than those of the earlier cohort. Thus, in looking at the entire pool of *Praxis* mathematics test takers, the middle-school test takers' lower scores masked substantial gains in the quality of the prospective secondary subject teacher pool.

Figure 22

SAT Scores for* Praxis *Middle-School and Secondary Subject Test Takers for Math and English Licensure Fields



During the last decade, policies have been put in place to improve the quality of the teaching force. This study examines changes in SAT scores and college grades for two cohorts of *Praxis* test takers to determine whether the quality of the teacher pool has improved over an eight-year period. While these are relatively simple and generic measures, each has been associated with teacher quality. The results support the view that the policies are working and have contributed to a stronger cohort of individuals seeking teacher certification. These data are also consistent with the results of recent surveys that asked principals and education school deans to compare current and past prospective teachers.[39]

Educational policies, such as charter schools, vouchers, and teacher education and quality are often divisive. Strident positions yield simplistic questions that pit intervention against intervention in a politicized rhetorical battle that preempts the systematic study and improvement of the core problems. Complex social and educational dilemmas are seldom solved by any single, independent policy initiative.

The current study suggests that when policies target a common objective and employ a variety of strategies, real change can happen. The findings of this study are quite remarkable — seldom have policy changes been associated with such positive impact in so little time.

Many institutions can share credit for increasing the quality of prospective teachers. States and teacher education programs have improved the overall academic quality of prospective teachers by establishing minimum GPA requirements and rigorous testing standards. Raising the requirements to pass the *Praxis* test has created a stronger group of future teachers. States have also encouraged alternate route pathways, which are attracting candidates who are both comparable to those currently enrolled in teacher education programs and stronger in academic ability than prospective teachers from the earlier cohort.

Teacher education accreditation institutions such as NCATE and TEAC have strengthened accreditation standards by highlighting the demonstration of content and pedagogical competence by graduates of teacher education programs. Federal efforts as part of NCLB have helped ensure that all teachers are not only licensed, but licensed in the areas in which they actually teach. Public accountability has increased as a result of federal mandates that require teacher education programs and states to report licensure test performance. Collectively, these forces have created conditions that are likely to have contributed to a stronger pool of prospective teachers.

The requirements of NCLB and HQT are most likely responsible for the large increase in test takers on teacher licensure exams who have prior teaching experience. An important lesson from these findings is that licensure test performance must be examined in light of teaching experience. Of course, it is important to remember that the experienced teachers taking the *Praxis* test because of HQT are not representative of the entire pool of experienced teachers. These are individuals who have either had emergency licenses or licenses that are not appropriate for the content they teach. Including these experienced teachers changes the profile of the testing pool. It is impossible to make sense of local and national trends of *Praxis* test takers without taking this into account.

It is also important to consider that more people are taking middle-school *Praxis* tests. While more individuals are taking tests to attain licenses in specific content areas, it is also clear that not all content-based assessments are equally demanding. Individuals taking the middle-school tests have far less academic preparation in specific content areas than those seeking secondary subject licensure. The profile of test takers for middle-school licensure more closely resembles that of elementary generalists than of secondary subject teachers.

Although there is a consensus that teachers of specific content in self-contained classrooms ought to have subject-matter licenses, the impact of this policy on this large group of middle-school teachers is unclear. Are these elementary-school trained teachers stronger than prior cohorts of individuals teaching middle-school subject areas? Have the academic qualifications of middle-school teachers changed? These questions merit further examination.

[39] "The MetLife Survey of the American Teacher: Expectations and Experiences," in D. Markow, C. Moessner and H. Horowitz (eds.), *A Survey of Teachers, Principals and Leaders of College Education Programs*, MetLife, 2006.

Despite the generally promising news contained in this report, several challenges remain. First, although academic quality has increased among all racial/ethnic groups, today's prospective teaching pool is no more diverse than it was a decade ago. The nation is failing to develop a teaching force that in any way mirrors the changing demographics in this country. It is worth noting, however, that raising the bar for teacher certification has **not** resulted in a decrease in the proportion of minority candidates, a possibility that was suggested from the earlier research study.

A second challenge that remains is the relatively weak SAT scores and GPAs of those who seek elementary, physical, or special education certifications. Although the SAT scores and grades of these groups also improved during the last eight years, their SAT scores still lag behind those of other college graduates. On the other hand, those with secondary subject licenses continue to be an academically strong group whose SAT scores and GPAs have grown stronger over time.

Since this study examines only those who have taken the *Praxis* licensure tests, future research should explore what these observed changes mean for hiring and retention in different kinds of schools and districts. For example, where are teachers with different characteristics actually teaching? A recent study found that the uneven distribution of qualified teachers continues across districts with different socioeconomic characteristics.[40]

Nevertheless, given prior research, the promising changes observed in this study bode well for student learning. If a teacher's academic ability (as indicated by SAT scores and GPA) is associated with student learning,[41] then the increases shown in this study ought to have long-term impact on student academic achievement. But it is only through sustained, long-term research studies of teachers and students that the ultimate consequences of what appears to be a positive set of data can be fully understood.

[40] U.S. Department of Education, 2007.
[41] Ferguson, 1991; Greenwald, Hedges, and Laine, 1996.

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