

Who Gets Hired to Teach? The Case of Pennsylvania

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This report takes a close look at teacher preparation and hiring practices in Pennsylvania, and then considers the qualifications of those who ultimately emerge from the process and are hired to teach in the state. It reviews in detail the various factors that conspire to produce a poorly qualified teaching force: low admissions standards for prospective teachers; vague curricular requirements at teachers colleges; low cut-off scores on licensing exams; and misguided (and sometimes questionable) hiring practices that place little emphasis on an applicant's content knowledge. While the weaknesses of pre-service teacher training are not unfamiliar, Strauss contends that the flaws in the hiring process itself turn out to be so great that they may overwhelm even an improved preparation system.

Introduction¹

In the summer of 1998, Paul Cellucci, Acting Governor of Massachusetts, publicly proclaimed his dismay over the poor performance of prospective teachers on standardized examinations; 59 percent of them had failed at least one part of this examination, which was developed by National Evaluation Systems for the Massachusetts Department of Education. After his successful election in November, Cellucci reiterated his call to the legislature to fund the testing of already-employed teachers to find out what they know.

According to *Education Week*, in the second round of mandatory test-taking, 55 percent of the first-time Massachusetts test-takers passed the *entire* exam; 81 percent passed the reading module, 75 percent passed the writing module, and 68 percent passed their subject matter tests.² Despite these substantial performance improvements over those in the first round, Governor Cellucci continues to call for the testing of veteran teachers as well. However, Stephen Gorrie, president of the 84,000 member Massachusetts Teacher association, the NEA affiliate, says his union will "vigorously oppose" such testing. When Massachusetts Senator John Kerry was an announced presidential candidate, he made the teacher quality issue a campaign issue. Several proposals are circulating that would close down any Massachusetts

schools of education in which more than 20 percent of the teacher candidates fail the exam.

As our century closes, most governors, responsible along with their legislatures for fulfilling their states' constitutional obligation to provide public education, recognize that continued prosperity will increasingly depend on how well educated their children are. The link from children's education to what they are taught and the quality of those teaching is well understood. Making sure that classroom teachers know and can effectively teach more demanding material, however, is no simple matter, and one that states are struggling with.

My purpose here is to explain how one state prepares its teachers for the public school classroom, describe who in fact gets hired and why, and discuss in practical terms what is involved in improving the quality of classroom teachers.

Pennsylvania was chosen as the case study because I have been examining and writing about it for better than a decade. This research is unusual because it has been done with all of the pertinent administrative records of the state under signed confidentiality agreements. A longer monograph, which I developed for the Pennsylvania State Board of Education in 1997 and which was publicly released in July 1998, supplies the basis for this essay.

The section that follows this one lays out the basic facts of how Pennsylvania colleges and universities offer state-approved course work so that their students can become licensed public-school teachers. It also discusses key variables or policy decisions that affect the nature or quality of the classroom teacher.

The third section describes who actually gets hired to teach, and examines their quality in terms of standardized-test scores. It also describes the results of a unique survey of Pennsylvania school hiring practices, and relates varying practices to different measures of student achievement.

The final section analyzes conventional and unconventional strategies to improve the quality of classroom teachers.

Because of space limitations, I do not confirm via a literature review the common sense notion that students assigned to teachers with more subject knowledge are students who themselves perform better in the subject matter when independently tested.³

I caution the reader that, as between analysts who conclude that the teacher quality problem is due to teachers never having learned how to teach properly (i.e., not having been properly instructed in pedagogy), and those who conclude that the problem stems from their never having learned their subject matter (i.e. not having achieved proper content knowledge), I fall squarely into the second camp.⁴ Also, among those who opine on how to improve teacher quality, I tend to emphasize

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more than other analysts the importance of the hiring decision as contrasted with simply improving the pool of applicants.

Teacher Licensing in Pennsylvania

Several state agencies are involved in teacher licensure. All derive their authority from the state constitution and acts of the General Assembly.

The Pennsylvania School Code and Code of Regulations are the official legal documents implemented by the Governor and Pennsylvania Department of Education (PDE).⁵ Legislative action can supersede any regulatory proposals by the Executive Branch or State Board of Education. This means that any attempts to alter teacher licensure requirements through the regulatory process can be impeded by interest groups (e.g., teachers unions, school board associations, etc.) that appeal to the General Assembly.

State licensing procedures for teachers have gone through several metamorphoses since the turn of the century. Elsbee observed in 1939 that teacher reform in the first third of this century involved centralization of the licensing function in the state department of education, the substitution of approved training for examinations, and the differentiation of certificates according to the nature of the teachers' preparation.⁶

In the years since Elsbee noted these trends, fashion and practice in a number of areas have changed. For example, teacher testing has again become widespread since the mid 1980s and is now used in conjunction with program approval to verify that prospective teachers know their subject matter at some competency level. Central licensing within state departments of education has been replaced in some states by independent licensing bureaus that report directly to legislatures and are separately funded.

State education agencies have evolved to deal with the regulatory standards that a college or university must meet for its teacher preparation program to be approved; with the requirements for student teaching; with the definition of core areas of teacher knowledge to be tested through standardized examinations and the setting of passing scores for those exams; with ongoing professional development requirements; and with procedures for revocation and suspension of certification.

Certification

Pennsylvania is one of thirty-nine states that require prospective teachers to earn a degree at a state-approved college or university. Unlike many states, however, Pennsylvania does not stipulate what courses the candidate must take. Rather, the state relies on PDE's program approval process to review each institution's requirements or curricula. Pennsylvania education regulations currently do not stipulate any admissions requirements for teacher preparation programs, although the prospective teacher must pass standardized general and subject matter tests produced by the

Educational Testing Service.⁷ Thus, most of the quality control is imposed by the teacher preparation institution itself with little state supervision or oversight.⁸

Teacher preparation programs may be reviewed at any time by PDE but reviews must be conducted at five-year intervals. Programs must meet both general and specific standards. The major general standards for approval include the following: the institution's education faculty shall have experience at the elementary, secondary, supervisory, or administrative level commensurate with the candidate's area of study; the institution shall document policies for admission into, retention in, and completion of a program⁹; the institution must encourage nontraditional students; the general education portion of a certification program should be equivalent to at least one-third of a baccalaureate degree and should include studies in the arts, humanities, and the natural and social sciences; the program will address issues of diversity and multiculturalism; and the instructional certification program shall require professional studies in teaching methodology (e.g., human development, historical issues in education, developmental reading and reading in the content area, instructional resource identification, and computer literacy).

PDE regulations also govern the specific standards that each program must satisfy in order to be approved. For example, a biology program must include the study of living materials in laboratory as well as field, and the interaction of biology with ethical and human implications in areas such as genetic screening, cloning, organ transplant. An approved program in elementary education requires study of the process of language acquisition and the measurement and evaluation of learning in the cognitive, psychomotor, and affective domains, among other things. During student teaching, the candidate must demonstrate competency in these areas.

Individuals seeking to become certified as teachers in Pennsylvania must be of good moral character; produce a physician's certificate verifying that they possess the mental and physical capabilities required for teaching; attain the age of eighteen; earn a baccalaureate degree (exceptions involve temporary and vocational certificates); and complete an approved program of teacher education.

Certification in Pennsylvania involves two stages: provisional and permanent. The provisional certificate is valid for six service years. Candidates must pass the Pennsylvania Teacher Certification Test, which consists of four areas: Basic Skills; General Skills; Principles of Learning and Teaching, K-6 or Principles of Learning and Teaching 7-12; and Specialization Areas (see discussion below).

Movement from a provisional to permanent certificate requires completion of an induction program developed by the school district; twenty-four semester hours of course work beyond the baccalaureate; six credit hours every five years in department-approved in-service education courses, collegiate studies, or studies at

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degree-granting institutions every five years; and satisfactory completion of three years of service.

In order to be certified to teach a particular subject, the candidate must fulfill a program of study that the college has stipulated will meet the specific program approval standards, and that has been approved by PDE. The teaching certificate contains an *endorsement* by the state which certifies that the teacher is legally qualified to teach in the particular subject area. (Separately, PDE states what endorsements are required to teach specific courses at specific grade levels.) Endorsements require graduation from an approved program and passage of the appropriate subject test.

The emergency certificate is endorsed for a single subject. It is issued only at the request of an employing public-school entity or the equivalent. The chief administrator of the requesting entity must certify that he has exhausted all reasonable avenues and has not located any properly certified applicant. Applicants for emergency certificates must meet a state health requirement, U.S. citizenship requirement, have a bachelor's degree; pass the Professional Skills Test; and not have been terminated from a position in a public school.

An intern certificate is valid for three calendar years. It is designed to allow entry into the teaching profession for qualified persons who already possess a baccalaureate degree. The candidate must complete an approved certification program's pre-admission screening and be accepted into the program. He must pass the basic skills, general knowledge, and subject matter area portion of the test. Upon completion of his internship, the candidate must pass either the Praxis Principles of Learning and Teaching K-6 for Elementary and Early Childhood Education or the Principles of Learning and Teaching 7-12 for secondary areas before receiving a provisional certificate. Continuous enrollment and satisfactory progress in a Teacher Intern Program lead towards a Level I Certificate.¹⁰

Details that Matter

Having shown some major components of Pennsylvania's regulations, let us now review them with a careful eye.

For the past six months, the Governor and Pennsylvania Department of Education have been engaged in protracted negotiations with the Pennsylvania Association of Colleges of Teachers Education (PACTE) over moving from the program approval standards described above to new standards based on requiring a full college major (e.g., that prospective biology teachers take the same course work as a true biology major), and both admissions and graduation grade point average requirements.

While such a change has enormous merit, whether it becomes state policy will depend on the tenacity of policymakers to insist that a biology teacher must know biology, and the willingness of education schools to suffer what they claim will be catastrophic reductions in overall enrollment to allow this to happen.

Moving prospective teachers from schools of education to academic departments to obtain their subject matter training will no doubt be an improvement. There are, to be sure, all kinds of biology departments, and all kinds of required course work to become a biology major. Still, this is a minor concern compared to what current program approval standards permit.

The vagueness in today's standards also means that the Department can choose to enforce them more or less leniently. Teacher preparation can be a lucrative activity for a college or university, and there are significant tensions over market share. The combatants are the private colleges and universities, which receive no state subsidies, versus the fourteen state-supported former normal schools whose state appropriations are their fiscal lifeblood, along with the three state-related universities (University of Pittsburgh, Penn State, and Temple) which receive substantial state appropriations and engage in significant teacher training. Considerable pressure is applied when gubernatorial administrations change to place a champion in the position of Deputy Secretary for Higher Education in the Pennsylvania Department of Education. That person has primary authority to approve or disapprove a program and substantial leeway to do what he or she wants.

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Comments on Program Standards

Note that there are few restrictions or prescriptions about the faculty of an approved program. They need not be expert in the subject areas in which prospective teachers wish to teach. The only requirement is that some must have experience in the public schools.

There is no obligation for the faculty to have Ph.D.'s or engage in scholarly research, and there is no mention of what the tenure track faculty should have by way of education background or expertise, as contrasted with what the adjunct faculty must have. Requiring, in effect, that only former school teachers teach prospective teachers has the effect of ensuring that current classroom practices will be perpetuated.

The specific program standards are also problematic. The curricular requirements for a biology teacher merely require him or her to take studies with living materials in the laboratory as well as to have field experiences. These "requirements" could encompass almost anything. First, "studies" are not credit hours. Second, living materials could be studied by simply going to a zoo and looking at animals! Third, simply requiring a college or university to require "...studies or experiences in..." without providing time or credit requirements encourages the training institution to economize on faculty and student time.

Not detailing the composition of particular studies, such as what must be included in the content of a chemistry or cellular biology course, means that the requirements

might be met with a few survey courses. The effect of structuring curricula requirements in this fashion is to put the obligation for oversight and quality control on the education department in the college or university rather than on the state agency's shoulders.

Such vague state curricular requirements virtually guarantee wide diversity in the teacher knowledge base. One can envisage a college education department, facing financial pressures, that cuts the number of specialized biology courses, and substitutes survey courses. The "...studies of and experiences in..." test would still be met.

Such vagueness actually gives local school districts almost complete discretion in hiring. Consider what these vague standards mean for Pennsylvania's 106,000 current classroom teachers. Given that virtually all of them are tenured, what they had to learn to earn a teaching certificate is what they know today. And given reciprocity among the states, such low standards mean that other states hiring teachers who meet Pennsylvania's low requirements face equal uncertainties.

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Admissions Standards

Pennsylvania requires each college education department or education school to have admissions and retention requirements, but does not specify what these must be. For example, there is no state requirement that only those earning a bona fide high school-diploma may be admitted into an approved teacher preparation program.

More importantly, Pennsylvania does not stipulate as part of its program approval requirements any minimum score on the American College Test (ACT) or Scholastic Assessment Test (SAT).¹¹ Connecticut, by contrast, requires that applicants demonstrate minimum passing scores on one of several examinations. If the student offers the SAT, for example, he must have a combined SAT score in excess of 1,000 (with neither portion falling below 400). In 1997, a combined SAT score of 1,000 was at the 50th percentile. This is not very high, but it is a standard.

Passing the Tests

Pennsylvania, like most states, requires that prospective teachers earn passing scores on various standardized tests. This requirement was first established in 1987 when the General Assembly directed the Department of Education to require standardized tests of teachers; however, the passing test scores are set by panels of Pennsylvania teachers, not by the independent agency that constructed the tests. These passing scores were kept so low that, historically, about 95 percent of those taking the tests passed them.¹²

High pass rates on standardized exams can mean several things: the test is easy, the passing score is set very low, and/or the candidates taking the test are all highly qualified. Remarkably, Pennsylvania was unable for ten years to set any passing scores for chemistry and physics, the result being that everyone who took these tests, and passed the general skills tests required of all prospective teachers, was awarded a chemistry or physics certificate.

Such high passing rates can not be found in other areas of professional licensure. It is common for fewer than half of those taking the national CPA exam to pass all parts, and about the same for those taking state bar exams. Europeans also enforce much stricter standardized testing for prospective teachers. In France, no more than 15 percent pass the most demanding certificate examination.¹³

Emergency Certificates and Waivers

Issuance of emergency certificates is the primary mechanism by which local superintendents circumvent Pennsylvania's modest certification requirements. This essentially allows a local superintendent to hire whomever he wishes and this permits the employment of either more or less academically qualified teachers. My understanding of actual practice in Pennsylvania is that it is typically used to deal with demands by school board members and other interested members of the community to hire particular individuals regardless of their academic qualifications.

The key to see how this can happen is to consider carefully the phrase "...no fully qualified AND properly certified applicant available..." Since the term "fully qualified" is not defined anywhere in the regulations, the local superintendent may interpret it to mean whatever he needs to in order to achieve his hiring objective.

The superintendent merely has to plead with the state certification bureau, typically a few weeks before the start of classes, to issue the emergency certificate, and assert that he could not find anyone who is fully qualified. Swamped, and perhaps receiving supporting evidence from other interested parties, certification bureau officials get pressured into granting local officials what they ask for.¹⁴

Michigan, by contrast, requires the Superintendent of Public Instruction to find that the education of children is at risk should an emergency certificate not be granted. That mechanism makes the education of the children the decision criterion, and requires the State to make a positive finding about the relationship between the children's education and the applicant for the emergency certificate rather than requiring a state official merely to weigh a local official's plea on behalf of the noncertificated applicant.¹⁵

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Professional Development

Much is made in Pennsylvania of the subsequent education requirements that must be met in order to obtain a permanent certificate; yet in-service courses count equally with courses from approved university programs. In-service training typically occurs in a district by declaring a school in-service day which translates into the children staying home and the teachers enjoying a seminar, with coffee and doughnuts and catered lunch.¹⁶ The twenty-four-hour credit requirement can also be earned in part via the required teaching internship; this effectively permits double counting of student teaching.

The Teacher Market

Much of the impetus for teacher quality reform has come from the observation that a large fraction of the teacher force is eligible for retirement in the next decade. As much as 60 percent of Pennsylvania's classroom teacher force could turn over by 2006. At fifty-five years of age and thirty years of service, a Pennsylvania teacher is eligible for full retirement benefits. The legislature has also kept open an early retirement window without penalty at fifty-five and 27.5 years respectively. In 1993, about 10,800 teachers and administrators, 9 percent of the professional personnel in Pennsylvania's public schools, elected to retire. (Half of the districts' business managers elected to retire.)

Large-scale retirements create an opportunity to upgrade the skills of the teacher workforce if teacher preparation institutions can be encouraged to raise their admissions and curricula standards.¹⁷ In 1996/7, the median age of Pennsylvania classroom teachers was forty-five years. Median years of total experience (countable for state retirement plan purposes) was sixteen years.¹⁸

While a retirement cliff is nearing for many districts, the hiring of new teachers straight out of education school has been modest: about 1,300 newly certified teachers were hired in each of the past several years; about 5,100 total teachers are annually hired. The supply of new teaching certificates continues to exceed the aggregate demand: about 20,000 new teaching certificates are produced each year by Pennsylvania's ninety-one approved programs. Over the period 1991-97, 39,000 elementary teaching certificates were awarded, equivalent to the total number of employed elementary teachers statewide!¹⁹ Far more elementary-school teachers have been trained in Pennsylvania than are being hired— a pattern that is likely to persist into the indefinite future unless corrective action is taken.²⁰

California encourages teacher market realism by statutorily obligating each teacher preparation institution to publish its graduates' employment rates. This is one of the reforms proposed by the Pennsylvania State Board of Education but resisted by many schools of education as unnecessary and administratively infeasible. They claim to have no mechanism to follow their graduates' labor market activities. Deans of edu-

cation schools contest my conclusion that most school teachers trained and certified in Pennsylvania are never able to find a teaching position by asserting that their graduates take jobs outside of the state. This may or may not be true.

How California teacher preparation institutions are able to track the employment of their graduates while Pennsylvania's institutions cannot remains a mystery. Since records were kept, Pennsylvania has certified over 516,000 public school teachers, while only 106,000 are currently employed in the classroom.²¹

Teacher Quality

When high-school seniors take SATs, they are asked to report their intended college major. The College Board then reports the results. Table 1 displays the mean verbal and math SAT scores from Fall 1996 as reported by Pennsylvania high-school seniors. It also displays the U.S. scores. Several points are evident. First, Pennsylvania's SAT scores are lower than the national scores in every field.

Intended Major	Mean SAT Verbal	Mean SAT Math	Combined Math & Verbal	Combined Math & Verbal Percentile
US Education	487	477	964	37.7%
PA Education	483	471	954	35.3%
US Mathematics	552	626	1178	85.3%
PA Mathematics	542	614	1156	81.9%
US Biological Science	546	545	1091	69.0%
PA Biological Science	540	528	1068	63.7%
US Physical Science	575	595	1170	84.1%
PA Physical Science	562	578	1140	79.1%
US Language & Literature	605	545	1150	80.9%
PA Language & Literature	595	527	1122	75.6%
US Business	482	500	982	42.2%
PA Business	479	488	967	38.5%

Source: ETS Communication to author, author's calculations.

Second, Pennsylvania's high school seniors intending to become education majors scored substantially below their classmates interested in pursuing other academic majors. For example, the mean SAT math score of an intended education major was 471 compared to 614 for intended math majors, a difference of 30 percent. When

the same education major's verbal mean SAT score of 483 is compared to the 595 of a language and literature major, we observe a 26 percent difference.

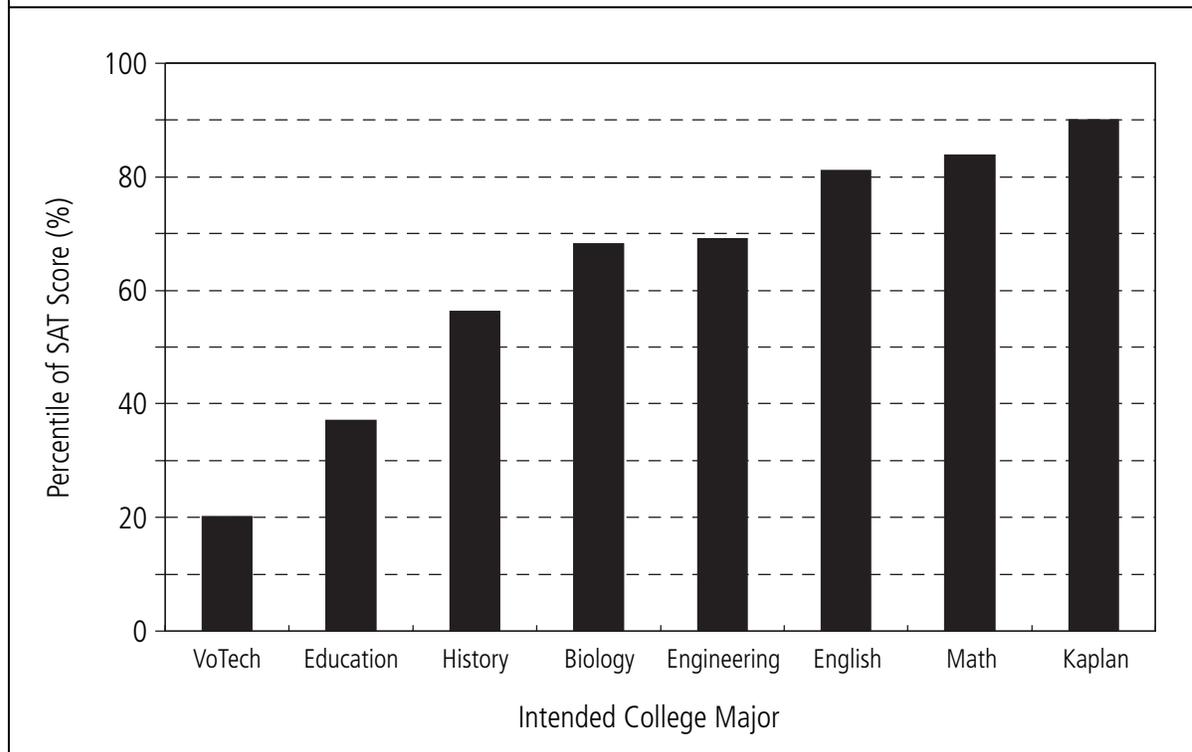
The combined math and verbal score of those interested in becoming teachers was at the 35th percentile of all those in Pennsylvania who took the SAT while those intending to be math or English majors was above the 80th percentile.

If the academic achievement level of classroom teachers hovers at the 35th percentile, that means that two-thirds of the students in the classroom have stronger scholastic achievement than did their classroom teacher a few years before.

The fact that future teachers' SAT scores are well below average should be contrasted with those required by Kaplan Education Systems, which sells a well-known SAT preparation course. Kaplan will not consider hiring anyone to teach in its SAT preparation program who scores below the 90th percentile on the math and verbal SAT tests. Princeton Review has a similar requirement. Figure 1 displays the *relative* position of combined SAT scores by intended major in 1997, and contrasts what Kaplan requires its instructors to have.

Most states independently measure the general and specific knowledge of prospective teachers as they are finishing their college degree. ETS historically sold the National Teacher Examination (NTE) to thirty-four states, but is replacing it with the Praxis

Figure 1. 1997 Combined National Math and Verbal SAT Scores by Intended College Major of HS Seniors



examinations. Table 2 displays several general skill-and-knowledge examinations that ETS offers for teaching candidates, and the two specialty biology tests that prospective Pennsylvania biology teachers must take, along with passing scores as of 1998 for the Commonwealth's biology teachers.²²

Consider the Biology Knowledge 2 test. Pennsylvania's biology teachers needed a score of 135 to pass it. Since scores range from 100 to 200, a score of 135 means that students must correctly answer 35 percent of questions of average difficulty to pass the test. To put these figures in further perspective, 135 was at the 25th percentile of the national distribution of Biology Knowledge 2 scores.²³ It's not unreasonable to ask why a panel of experienced teachers in Pennsylvania believed that their state's biology teaching candidates need correctly answer only 35 percent of questions of average difficulty.

Table 2. Passing Core Battery (CB) and Biology Test Scores for Biology Teaching Candidates in Pennsylvania (1998)		
Standardized Test	Passing Score	Questions to be answered correctly to pass
CB Communications	646 (out of 990)	53.5%
CB General Knowledge	644 (out of 990)	53.2%
CB Professional Knowledge	643 (out of 990)	53.1%
Biology Knowledge 1	144 (out of 200)	44.0%
Biology Knowledge 2	135 (out of 200)	35.0%

Source: Pennsylvania Department of Education, Educational Testing Service, author's calculations.

Given the vast numbers (20,000+) of teaching certificates awarded each year by Pennsylvania teacher preparation institutions, one may fairly ask what is the knowledge level of these potential classroom teachers. Given the weak program approval standards discussed above, and the protestations from some deans that their school's curricula and graduation requirements are more demanding than the state standards, it is useful to check independently to see how these prospective teachers (or the total of supply from which districts may hire) do on independent, standardized tests. Table 3 shows the range of NTE scores for nine subject areas, and identifies the college or university that had the highest and lowest median NTE scores for each. The table also translates the high and low median scores into the percentage of correct answers on questions of average difficulty. With regard to the top scores, four private colleges—Swarthmore (3), Lafayette (3), Chatham (2), and Bryn Mawr (1)—shared the honors. Translated into percent correct, their scores ranged from 63.5 percent correct in chemistry to 84.5 percent correct in English.

Table 3. Teacher Test Scores in Pennsylvania by College or University Median National Teacher Exam (NTE) Scores (1987-97) in 9 Specialty Areas:

Specialty Area	Number of Programs	Top Program	Passing Score	Top Program's Median NTE	% Correct of Median
Elementary	79	Lafayette	570	710	62.2%
Mathematics	79	Swarthmore	540	740	66.2%
Chemistry	64	Chatham	500	720	63.5%
Biology	77	Lafayette	580	> 800	>74.3%
Physics	50	Swarthmore	440	810	75.7%
General Science	64	Chatham	None	> 740	>66.2%
Earth and Space	32	Lafayette	570	> 800	74.3%
English	78	Swarthmore	490	875	84.5%
Social Studies	79	Bryn Mawr	580	685	58.8%
Specialty Area	Number of Programs	Bottom Program	Passing Score	Bottom Program's Median NTE	% Correct of Median
Elementary	79	Ursinus	570	< 570	<43.2%
Mathematics	79	Cheyney	540	500	33.8%
Chemistry	64	Waynesburg	500	380	17.6%
Biology	77	Cheyney	580	355	14.2%
Physics	50	Lincoln	440	285	4.7%
General Science	64	Holy Family	None	520	36.5%
Earth and Space	32	King's College	570	<350	< 13.5%
English	78	Cheyney	490	580	44.6%
Social Studies	79	Waynesburg	580	550	40.5%

Source: author's tabulations of NTE scores in Pennsylvania.

With regard to the lowest median NTE scores in the nine subject areas, they occurred among six institutions—Cheyney (3), Holy Family (1), King's College (1), Lincoln (1), Ursinus (1), and Waynesburg (2). The range of percent correct went from 4.7 percent in physics to 44.6 percent in English. Remarkably, if one correlates the employment rate of each institution's graduates by subject area with the institution's median NTE score, there is no reliable relationship except for mathematics (+.24) and chemistry (-.26).²⁴ The latter underscores the harsh reality that, when no standards were imposed during the ten-year hiatus, districts were careless about whom they hired, so long as the person had a certificate to teach chemistry.²⁵

Who Gets Hired to Teach in Pennsylvania and Why?

It is not surprising to find that teacher preparation programs vary widely in what their graduates know about the subjects they intend to teach, for the programs also vary widely in their admissions standards, curricular requirements, cost, and faculty. For children and parents, the key issues are: who winds up in front of the children, what do they know, and how does it affect the students' learning?

Because Pennsylvania school districts typically do not hire teachers from preparation programs located more than seventy miles away, it makes sense to examine the NTE scores of employed teachers by Metropolitan Statistical Area (MSA).²⁶ Table 4 shows just how variable the knowledge of employed school teachers is. In the Allentown MSA, for example, there are twenty-two school districts. If we tabulate their median mathematics NTE score, the district whose teachers had the highest score had a 760 out of 990, or correctly answered 68.9 percent of questions of average difficulty. The school with the lowest median NTE score in the same MSA had a 540 (the mini-

Table 4. Employed Classroom Teacher Content Knowledge: Highest and Lowest District Median NTE Scores by Pennsylvania Metropolitan Statistical Area

MSA	Number of Districts In MSA	MSA's High & Low NTE Score Mathematics	MSA's High & Low NTE Score Biology	MSA's High & Low NTE Score Chemistry	MSA's High & Low NTE Score Physics
Allentown	22	760-540	910-580	530-390	640-540
Altoona	7	610-560	660-620	720-690	NA
Beaver	15	720-540	750-725	590-470	700-410
Erie	13	650-580	790-610	560-490	460-380
Harrisburg	29	720-570	900-630	690-460	650-430
Johnstown	23	760-570	720-490	560-490	700-460
Lancaster	16	800-620	860-630	710-520	660-360
Philadelphia	62	850-560	825-600	770-440	820-460
Pittsburgh	80	730-510	860-480	770-415	740-380
Reading	18	730-510	780-620	640-530	NA
Scranton	33	710-560	810-390	NA	520-380
Sharon	12	790-590	750-675	600-450	NA
State College	4	800-640	840-690	NA	NA
Williamsport	8	650-550	NA	NA	NA
York	21	840-570	755-590	685-550	660-450
Non-MSA	137	800-540	910-570	910-390	645-450

Source: author's calculations.

One can find examples of both rich districts being selective and rich districts hiring elementary teachers with low NTE scores, as well as examples of poor districts hiring elementary classroom teachers with high scores and poor districts hiring teachers with low NTE scores.

mum passing score under state regulations) or correctly answered 39.2 percent of questions of average difficulty.

In biology, the district with the highest median biology NTE scored 910 out of 990 or correctly answered 89.2 percent of questions of average difficulty, while the bottom district's median NTE score was 580 or correctly answered 44.6 percent of questions of average difficulty. It is difficult to imagine that students exposed to a teacher with half the content knowledge of another would be getting the same biology education.

If one carefully examines Table 4, one sees that, in chemistry and physics, districts hired teachers with little subject knowledge. Somewhere in the Lancaster MSA, a physics teacher was hired who scored 360 out of 990 on the NTE physics test. This translates into answering correctly 14.9 percent of questions of average difficulty. This occurred, as noted above, because for ten years the state failed to set passing scores in chemistry and physics, and simply certified anyone who took the exam and passed the core battery tests.

In view of the wide variations in results shown by employed teachers on standardized tests, we might ask, what is happening? Is the variation due to inadequate salary levels or large variations in district wealth? If one looks closely at the scores of elementary teachers hired, one can find examples of both rich districts being selective and rich districts hiring elementary teachers with low NTE scores, as well as examples of poor districts hiring elementary classroom teachers with high scores and poor districts hiring teachers with low NTE scores.²⁷

The Legal Framework

Some insights into these haphazard hiring patterns can be gained by examining the statutes governing the teacher hiring process in Pennsylvania, and the broader issue of district governance.

Pennsylvania law is silent about how teachers are to be recruited and hired except in Pittsburgh and Philadelphia. These two districts are obligated to hire from lists that rank candidates by measurable characteristics, and must present at least three names for each vacancy to the local board. Nowhere can one find in the School Code that districts seeking to hire teachers must advertise in newspapers of general circulation. Indeed, one encounters protestations of unnecessary expense in response to such suggestions.

The decision by a superintendent to make a job offer to an applicant must first be approved by public vote of the board. State law prohibits any school board member from voting on the employment of a relative. Yet these rules are less than they seem.

Let us examine in more detail the requirements to be a school board member, and the rules governing a board member's conduct. To be eligible to stand for election, a prospective member of a school board in Pennsylvania need only be a citizen of the Commonwealth, a person of good moral character, eighteen years or older, and a resident of the district for at least one year. Direct self-dealing is limited statutorily in several ways:

School employees are prohibited in Pennsylvania from serving on a board where they are employed; however, this does not preclude them serving on a board where they live if the district of residence is different from the district of employment.²⁸

School board members are prohibited under the School Code from voting on the appointment of a relative to a teaching position, and the Code prohibits a school board member from being interested in, or doing business, with the school district during the term of office. These are, however, only *direct* prohibitions, and do not deal with indirect conflicts of interest that might involve, say, a spouse, relative, or friend engaging in business with the district in which the school board member serves.

The Code prohibits a school board member from receiving, directly or indirectly, monies as a consequence of voting on matters which come before the board. By not participating in a vote on a contract decision, or by delegating decision-making over financial matters to a superintendent, or to other board members, a board member is relieved from this prohibition.

Prior to 1968, the oath of office administered to elected board members obligated them to affirm "...that I will not knowingly receive, either directly or indirectly, any money or other valuable thing for the performance or nonperformance of any act or duty pertaining to my office, other than compensation allowed by law." Effective November 22, 1968, however, the oath of office merely required affirmation to support, obey, and defend the State and US Constitution, and to discharge the duties of office with fidelity.²⁹

The Pennsylvania Ethics Commission is responsible for enforcing these modest rules. Examination of its decisions and case law indicates that the Commission interprets the ethical obligations of elected school board members narrowly. This means one can simply abstain from voting and log roll while friends and family are hired by the district on whose board one serves.³⁰ Moreover, by abstaining from voting on any contract or other money issue, a determined (and not ethically challenged) school board member can benefit indirectly from the board's appropriation of monies.

Districts consider test scores no more heavily than an applicant's willingness to engage in extracurricular activities.

Hiring Practices and Procedures

The second issue that arises when examining the test scores of employed teachers is the nature of the personnel process itself. In the Spring of 1997, a survey instrument

was designed and field-tested to elicit the ways by which local school districts go about hiring classroom teachers.³¹ The State Board of Education wrote each superintendent, school board president, and union president asking for their cooperation in filling out the fourteen page questionnaire. Confidentiality was guaranteed, and each stakeholder was told that the others were receiving the same questionnaire.

The following major points emerge from the resulting data:

1. About 40 percent of current teachers in the district obtained their high-school diploma or attended high school in the district where they work;
2. Only 49 percent of the districts have written hiring policies;³²
3. About one third of districts fill full-time openings from substitutes or part-time teachers whom they already know; 14 percent of full-time positions are filled from internal transfers within the district.
4. Only 25 percent of districts advertise openings outside of Pennsylvania; about 83 percent advertise outside their district; the major forms of advertising are the *Pennsylvania School Boards Association Bulletin*, word of mouth, bulletin boards in the district, education schools' placement offices, and local newspapers;
5. Twenty-six percent of districts reported requesting waivers from the Department of Education and 65 percent (of those requesting) obtained a waiver; only 27 percent of those requesting waivers stated that a waiver was requested because applicants were not fully qualified;
6. Independent evidence on content knowledge and caliber of certifying institution was about as important in recruiting as indications of community involvement, willingness to assist in extracurricular activities, and non-teaching work experience;

These results suggest, consistent with Ballou and Podgursky (1997), that most districts place little emphasis on the content knowledge of applicants other than what is reflected in their grade point averages.³³ Districts consider test scores no more heavily than an applicant's willingness to engage in extracurricular activities.

Student Outcomes

A question naturally arises as to whether the teacher employment process is associated with different levels of pupil achievement. Common sense suggests that the more careful districts are in selecting teachers, and the more attention that is paid to the academic background and achievement of teachers in the selection process, the more likely it is that districts' own students will perform better on competency and achievement tests.

Two kinds of evidence are available to investigate this relationship: simple correlations between measures of hiring practices and student achievement, and multiple regression results that hold constant the socioeconomic background of the students and the educational attainment of their parents.

What we find, broadly, is that the more professional the teacher-hiring process, the stronger is student achievement.

Statistical analysis revealed the following relations:

1. The higher the fraction of a district's teachers that attended its own high school, the lower *all* of its test scores are, and the lower is the fraction of high-school seniors with post-secondary education plans.
2. The more frequently a district requested waivers from PDE, the lower the various measures of student achievement. Correlations here range from $-.12$ to $-.18$.
3. Districts that request information beyond the mandatory state form tend to have students who achieve more highly across all grades, and also have a higher fraction of high school seniors with post-secondary education plans. Correlations here range from $+.168$ to $.25$; all are statistically significant. For instance, requesting written recommendations was significantly related to student achievement. Since candidates must obtain in writing others' opinions of their skills, this can be viewed as an indicator of how seriously the district views the application process. Evidently, districts that make this effort also have students who achieve more highly.
4. Initial screening on the basis of grades is associated with superior student achievement, as is screening on the basis of past performance in teaching and references and recommendations. Screening based on teaching experience is not associated with higher student performance. Where districts emphasize advanced degrees, test scores, and essays in their screening process, eleventh-grade student performance in math and reading is higher.
5. Where districts emphasize community involvement and willingness to do extracurricular activities in their initial screening, there is generally no relationship to student achievement.
6. Where districts screen applicants on the basis of whether or not applicants are district residents, student achievement at all grades is lower. These are some of the strongest correlations found: they range from $-.20$ to $-.30$.

Districts that use more professional personnel practices tend to be districts whose students are more likely to pursue post-secondary education and have higher math and reading achievement scores.

The above correlations conform with common sense: districts that use more professional personnel practices tend to be districts whose students are more likely to pursue post-secondary education and have higher math and reading achievement scores. Yet it is easy to imagine other factors, such as the socioeconomic status of students' families, playing important roles in explaining student achievement, and these need to be accounted for as well.

Econometric analysis that takes into account these background factors found the following:³⁴

Districts that hire their own graduates, holding constant the socioeconomic status of students currently being taught, are school districts whose achievement is lower. A 1 percent increase in the percentage of teachers hired from a school's own graduates is associated with a reduction of two-thirds of one percent in the percentage of high-school seniors with post-secondary education plans.

Hiring insularity depresses various measures of student achievement. These depressing effects are five to ten times the size of the effect of coming from impoverished families.³⁵ Thus, districts with children from AFDC families, whose standardized reading and math scores are lower than students from nonpoor families, do no one a favor if they hire their own graduates. A 1 percent increase in such employment will depress eleventh-grade reading and math scores by one tenth of one percent, while poverty, per se, reduces reading and math scores by just one-hundredth of 1 percent.

Conventional and Unconventional Reform Strategies

Teacher certification requirements are modest in Pennsylvania. As a result, there is a large pool of certified teachers from which districts make employment decisions, and that pool is highly variable in quality. The hiring process does little to ensure that those hired are the best teachers available. What can be done to improve teacher quality? Here are some conventional and unconventional reform strategies.

Conventional Reform Strategies

1. National Commission for Teaching and America's Future

In 1996, the National Commission on Teaching and America's Future recommended improving the quality of classroom instruction by shoring up the three-legged stool of teacher quality assurance — “teacher education program acceleration, initial teacher licensing, and advanced professional development.”³⁶ Leg one would be strengthened by requiring that programs be accredited by the National Council for Acceleration of Teacher Education (NCATE). Leg two would be strengthened by requiring that beginning teachers meet the standards being established by the Interstate Teacher Assessment and Support Consortium (INTASC), based in turn on the work of the National Board for Professional Teaching Standards. Leg three,

certification, involves utilizing the National Board's framework for assessing excellence in professional practice. Mainstream reform thus involves changes in program accreditation procedures and extensive use of a national master teacher certification.

Based on what we have seen in Pennsylvania, the reader may well harbor misgivings about this approach. The call for further accreditation by NCATE, for example, rings hollow. If one correlates by district any of the student achievement measures discussed earlier against the percentage of each district's teacher force graduated from NCATE-certified institutions in Pennsylvania, one finds that the relationship is *inverse*. The percentage of students with post-secondary school plans actually falls as the fraction of teachers from NCATE-certified programs rises.³⁷

Further, if one looks at the percentage of children testing below grade level, one finds that fraction growing with the fraction of a district's teacher force that graduated from NCATE-certified education programs in Pennsylvania. These empirical results are the *opposite* from what one would expect if NCATE approval were really a source of quality control for teacher preparation programs.³⁸

The National Board for Professional Teaching Standards holds out the hope of using master teachers to observe and certify others so that states can begin to reward their outstanding instructors. Yet this approach has two fundamental problems: it is based on peer review and has not been validated in terms of student achievement.

The process is also expensive and time consuming. Today, the U.S. has some 3 million classroom teachers, and just a few thousand National Board-certified teachers. If one assumes that the number of National Board-certified teachers doubles each year, one finds that evaluating 3 million teachers will take at least eleven years. Moreover, most of the beneficial effects accrue in the latter part of that time period. At \$2,000 per teacher, it would cost about \$6 billion to evaluate the nation's classroom teachers. Meanwhile, at least one-third of them will have retired and been replaced.

Then there is the harsh reality of SAT scores. If teachers' scores continue to hover around the 35th percentile, then no amount of accreditation or subsequent professional development will succeed in convincing the other two-thirds of students about the reality of what the classroom teacher knows.

2. *Requiring College Majors for New Teachers*

A second type of mainstream teacher quality reform is to require that future teachers have true college majors in the areas in which they teach. As noted earlier, this is the reform over which Governor Ridge and the Pennsylvania Department of Education have been gridlocked with higher education for the past six months.

By requiring true majors in English, mathematics, etc., still within just four years of course work, schools of education will go through radical downsizing as their courses get traded for those taught in other departments. Not only will course credits

The ideas suggested are unconventional for an economist, because they rely at least initially on properly aligning the civic duties, responsibilities, and authority of school board members.

decrease in schools of education, it is likely that enrollments will also drop sharply, since students who previously were able to avoid rigorous courses by taking education-school courses will no longer be able to get away with this. Some will simply choose not to go to college. Others will find that career opportunities resulting from the true college major are superior to those in the classroom. Finally, if minimum grade point averages, administered by departments outside schools of education, are imposed, as suggested in Pennsylvania, it is likely that applications will drop, and graduation rates along with them.

While I am mindful that this strategy is bitterly resisted by entrenched education departments and schools of education, it would solve a good part of the teacher quality problem by subjecting teachers to academic training in the fields they are going to teach. For this to be meaningful, however, state supervision of the definition of a college major needs to be imposed and actual student transcripts need to be randomly examined. Independent validation of subject knowledge can be accomplished by raising the passing Praxis scores, and insisting that they be validated in terms of pupil achievement.

3. *Elimination of Initial Certification Requirements: New York's Trial Balloon*

One of the most interesting teacher quality reforms being debated was New York's trial balloon to eliminate initial certification requirements entirely, and allow anyone who has a true college major in a subject area to apply for a teaching position and be allowed to teach. Two conditions were to be fulfilled: the prospective teacher would have to take some pedagogy and child development course work in the summer preceding the first year of teaching, and subsequently take additional, specified course work over the next several years to earn the equivalent of a Master of Arts in Teaching or MAT. At the institutional level, if at least 80 percent of students in a school of education do not pass the New York subject matter tests, then the school of education risked losing its program approval. This proposal was not adopted; one can speculate that schools of education fought it because it would have dried up their supply of applications (and therefore tuition income).

Another way to think about the New York trial balloon, or strengthening "alternative certification" mechanisms as it is called in other states, is to think about what sort of skills and knowledge a school district would obtain if it simply hired randomly from the pool of college graduates. Think of this approach as throwing a dart at the normal curve of SAT scores. On average, one would wind up hiring someone close to the mean SAT score, and not on the left side of the distribution at the 35th percentile as has been the case in Pennsylvania.³⁹

Still, this approach to improving teacher quality fails to deal with the local hiring decision, and one can fairly observe that it would do nothing to address likely subject matter shortfalls of current teachers.

Unconventional Reform Strategies

To make a difference today and tomorrow in terms of the quality of classroom teachers in Pennsylvania (or any state) may require new kinds of thinking. The ideas suggested below are unconventional for an economist, because they rely at least initially on properly aligning the civic duties, responsibilities, and authority of school board members.

The first step in straightening out local civic authority is to recast the oath of office that school board members must take so that they publicly agree to high standards of ethical conduct: they must agree not to benefit financially, directly or indirectly, from the activities of the school district.

Today, few states clearly prohibit conflicts of interest in business dealings of board members with the district which they govern. For example, only eight of thirty states whose state laws we have examined preclude elected school board members from having direct business dealings with the district that they were elected to govern. Sixteen even permit an elected board member to vote on the offer of a job to a relative.⁴⁰

Optimists may argue that such explicit regulation is unnecessary and accusatory. Let me reply by suggesting in business parlance that if one leaves “money on the table” why should we be surprised when someone picks it up? Lax ethical standards allow school board members, if they choose, “to take the money off the table” without regard to the effects on the education of children.⁴¹

Related to prohibiting self-dealing is the inclusion in school board and superintendent oaths of office that their purpose is to ensure that each student is to be educated to the full extent of his/her intellectual capabilities, and that it is their duty to keep the parents of schoolchildren completely informed of each student’s academic progress.⁴²

The rights and responsibilities of school board members and superintendents also need to be clarified. It is commonplace to hear board members complain that superintendents keep them in the dark about what is really going on, while superintendents routinely complain about board members meddling and micro-managing . Many superintendents seek to exploit asymmetric information relationships with their boards, and simply stonewall requests for information about curricula, student performance, costs, and so forth.

***What to do
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Another aspect of improving the ethical conduct of board members is to require meaningful financial disclosure and reasonable compensation of school board members. The purpose of financial disclosure is to create a basis for auditing the promise not to engage in self-dealing. The purpose of compensation is to ensure that people get paid something akin to their opportunity costs. Something on the order of \$7,500/year seems appropriate for the 400+ hours of time that school board members currently donate in Pennsylvania.

Dealing with the Teacher Inventory Problem: Parental Choice of Teachers

While many teachers will retire in the foreseeable future, others will remain in the classroom for a considerable period of time. What to do with the inventory of current, typically tenured teachers while expecting stronger performance from their students?

The first question is what do they know? Suggesting that tenured teachers be tested for their subject or content knowledge has so far found no takers among states pur-

Hiring teachers for the wrong reasons is a primary explanation of why schools fail.

suing education reform. Yet there are other ways to benchmark their content knowledge. One might, for example, begin with the presumption that every school district has a handful of nonproductive teachers. It seems likely, however, that while both school administrators and local union leaders know who those people are, the realities of the collective bargaining agreement and the unwillingness of school administrators to engage in conflict-ridden personnel procedures mean that these unsatisfactory teachers will remain in the classroom. Their continued presence not only adversely affects the students, but probably also demoralizes other teachers because they observe on a daily basis that nonperforming teachers get the same rewards as they do. One

way to address this problem is simply to allow parents to choose who their children's teachers will be each year, rather than the current procedure of having school administrators assign students to teachers.⁴³

At the extreme, "lemon" teachers will find themselves with few students. Since there is no prohibition in current collective-bargaining agreements against their getting paid even though they have no students to teach, and they are already budgeted for, the adverse effects on students in the classroom will be mitigated. This proposal has the additional advantage of being readily implemented by any superintendent and school board with gumption. It is not expensive. It is unlikely in all but the smallest districts that the diversion of students to other teachers will lead to much of an increase in classroom size since the number of "lemons" is small (I would guess under 5 percent of the teacher force), and the effect will be averaged across many other teachers.

As taxpayers become aware of a few teachers getting paid to not teach, pressure will grow over time on policymakers to solve this problem rather than allowing it to

fester. Undoubtedly, some unproductive teachers will realize that they must improve in order to have students to teach, and will become effective enough to attract pupils.⁴⁴ Others may choose to retire.

Compare this approach to dealing with the current teacher force with such notions as spending \$2,000 per teacher on the National Board for Professional Teacher Certification evaluation scheme. Empowering parents has no direct monetary costs, and is likely to have immediate, discernible, and widespread effects on teachers' own investments in themselves. It seems unlikely that near-lemon teachers would willingly permit their own classroom enrollments to drop too small as parents moved their children to other teachers who have stronger academic/subject backgrounds and pedagogical skills. The prospect of newspaper or TV coverage of nearly empty classrooms would be a wake-up call to all but the most obdurate. The near-lemon group would begin to brush up on their skills and become more concerned with classroom learning than heretofore.

Teacher Reform and the Charter/Voucher Movement

Hiring teachers for the wrong reasons is a primary explanation of why schools fail. Indeed, if one looks closely at successful school turnarounds, they virtually always include selection of a new manager (principal), and the authority to change staff, i.e., undo previous bad personnel decisions. A close look at what charters and vouchers do when they really work indicates that they circumvent historically bad teacher personnel decisions. The charter/voucher strategy creates alternative sources of education services involving different people. Because these teachers are unlikely to be unionized, and are likely to be younger than conventional staff in a conventional public-school system, they will be less expensive. Whether or not they perform better depends on precisely the same issues discussed above, i.e., whether individuals have strong academic preparation and demonstrate superior pedagogical skills.

One way to influence the quality of teaching in these institutions is to allow them to hire teachers who are not traditionally certified. Fights over whether teachers at charter or voucher institutions are certified are really fights over whether or not children empowered with choice will be consigned to teachers from the low end of the SAT distribution, or from the middle or high end of the SAT distribution.

Allowing charter or voucher schools to hire noncertified teachers is not enough, however. If choice laws do not insist that such teachers have strong general and subject knowledge (which can be determined by requiring a college academic major or inspecting their test scores), it is easy to envisage further disappointment. Choice without significant information for parents and children about the academic qualifications of teachers may not lead to any significant change. Failing to improve the substantive knowledge of teachers, while claiming to create more competition and choice in education, will simply waste more time, resources, and squander energy and initiative that could be devoted to ensuring that children learn more.

The Larger Picture

It is commonplace now to question requests by public education for more money. A nationally watched school-funding equity case in Pennsylvania recently lost, to the shock and dismay of several hundred rural and urban school districts. While large variances in per pupil spending were demonstrated by the plaintiffs, they failed to provide a factual link between different spending levels and the provision of a thorough and efficient education. Disparities between curricula and teacher quality were not addressed.

As noted at the outset, common sense tells us that improving student performance depends on improving curricula, the quality of new teachers, strengthening what employed teachers know, and the quality of hiring decisions. In this paper, I have candidly reviewed what current law, regulation, and actual practice entail with respect to teacher preparation and selection. It is not a confidence-inspiring picture.

This review may also have left the reader wondering how any reasonable person can say with a straight face that the problem of teacher quality will solve itself. It is beyond me that, faced with the facts, one could simply say that all will be well.

Devise a set of serious teacher standards, and bite the financial bullet to buy out the inventory of substandard teachers.

The astute reader may have noticed that, while I have exhaustively dealt with the nature of teacher supply and teacher hiring, I have not addressed whether it will be possible to induce the best academically qualified to *accept* K-12 teaching jobs.

Teacher salaries where I live are fairly high. The starting salary in the Pittsburgh Public Schools for nine months with a bachelor's degree is in excess of \$34,000, and in some affluent suburbs close to \$40,000. Rural and industrial districts offer far less, but one would be surprised how high *relative* salaries are, even if one compares nine-month to twelve-month salaries.

One also now sees the beginning of political competition among states and districts, as elected officials recognize that the public is upset over public education and wants better results. Most of the current crop of presidential hopefuls want to appear to be committed to education reform. It is perhaps imaginable within the next few years that, as facts of the sort developed above become accepted, the sensible solution to the problem will become politically acceptable: devise a set of serious teacher standards, and bite the financial bullet to buy out the inventory of substandard teachers. My conjecture is that the first governor who figures out how much it will cost, and can make a convincing case that the higher teacher standards and buyout costs are worth it, will be a political winner. I surmise that any movement towards serious teacher standards will produce a similar result for those who initiate it.

- ¹ This chapter is based on a monograph prepared for the Pennsylvania State Board of Education in conjunction with its consideration in 1997-8 of Pennsylvania's laws and regulations governing teacher preparation. The complete monograph and appendices, released July, 1998, is available on the author's web page: <http://www.heinz.cmu.edu/~rs9f/>, or from ERIC: Clearinghouse Number TM029186.
- ² Kerry A. White, "Education Takes Center Stage in Mass. Race," *Education Week*, 7 October 1998.
- ³ See, for example, Anthony E. Boardman, Otto A. Davis, and Peggy R. Sanday, "A Simultaneous Equations Model of the Educational Process," *Journal of Public Economics* 7 (1977): 23-49; Ronald Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal of Legislation* 28, no.2 (Summer 1991): 465-98; Ronald Ferguson and Helen F. Ladd, "How and Why Money Matters: An Analysis of Alabama Schools" in Helen F. Ladd, ed., *Holding Schools Accountable* (Washington, DC: Brookings Institution, 1996), 265-299; David H. Monk and Jennifer A. King, "Multilevel Teacher Resource Effects on Pupil Performance in Secondary Mathematics and Science: The Case of Teacher Subject-Matter Preparation" in Ronald Ehrenberg (ed.) *Choices and Consequences: Contemporary Policy Issues in Education* (Cornell University: ILR Press, 1995); Robert P. Strauss and Elizabeth A. Sawyer, "Some New Evidence on Teacher and Student Competency," *Economics of Education Review*, 5, no.1 (1986): 41-48.
- ⁴ Another distinction between myself and educational researchers and policy makers who emphasize pedagogy, as contrasted with subject knowledge, is my strong preference for defining and measuring effective pedagogy in terms of student learning rather than another teacher's approval of either the teacher's displayed pedagogical knowledge or displayed pedagogy in the classroom.
- ⁵ Institutional arrangements differ in other states but the line of authority from the legislature to schools is typically strong.
- ⁶ Willard S. Elsbee, *The American Teacher: Evolution of a Profession in a Democracy*, (New York, Cincinnati: American Book Company, 1939), 337.
- ⁷ The reader should be aware that Pennsylvania is in the midst of substantially revising its program approval standards. The text describes what has been in place through May, 1999. Pending changes would impose either grade point admissions requirements (3.0 GPA out of 4.0 after a phase-in period), or Praxis I Pre-professional Skills Test scores of 178 in math and 174 in reading. Other pending amendments substantially raise the course requirements for a prospective teacher by obligating teacher preparation programs to require the same general and disciplinary course work as for a Bachelor of Arts or Bachelor of Science degree. Thus, a prospective biology teacher would be required, should the amendments be adopted as proposed, to take the same courses as a biology major.
- ⁸ See Lori Bowes and Mindy Marks, "Teacher Preparation and Program Approval in Other States" in Robert P. Strauss et. al, *Teacher Preparation and Selection in Pennsylvania* (Harrisburg, Pa.: Pennsylvania State Board of Education, July 1998).
- ⁹ No suggestions are given as to what these policies are to be nor are any minimum requirements set.
- ¹⁰ In April 1999, Governor Tom Ridge and Secretary of Education Eugene Hickok announced that they would be establishing a new, experimental alternative route program for Pennsylvania, but it is unclear how much of an impact this program will have.
- ¹¹ There have been recent proposals to add requirements in Pennsylvania but they have not yet been approved.
- ¹² As we shall see, when we convert the passing scores into the fraction of correct answers on questions of average difficulty, we find that teachers are often asked to demonstrate that they know less than half of what is on the standardized examinations in order to earn a teaching certificate. It should, however, be noted that the passing scores for Pennsylvania are scheduled to be raised in September 1999.
- ¹³ See John H. Bishop, "Signaling, Incentives, and School Organization in France, the Netherlands, Britain, and the United States" in Eric Hanushek and Dale W. Jorgenson, eds., *Improving America's Schools: The Role of Incentives* (Washington, D.C.: National Academy Press, 1996).
- ¹⁴ The skeptical reader should know that this interpretation of leeway and how it is used to solve "local" problems was verified with several Pennsylvania school superintendents and personnel directors who were happy to give me their answers in private.
- ¹⁵ It is hard to understand how a state official in Lansing can know with certainty that failure to grant a request for an emergency certificate will work to the educational detriment of a student in Kalamazoo. However, Pennsylvania school officials have observed privately to me that the Michigan waiver test would cut down on the quantity of nonsense they have to deal with.
- ¹⁶ Most states require 180 days of attendance of five hours of teacher contact. Over time, in-service days have been negotiated by individual districts to count towards this contact requirement.
- ¹⁷ Some observe that those women now retiring are among the brightest and best trained of Pennsylvania teachers because they entered the teaching profession when this was one of the few professions open to educated women. As a result of affirmative action statutes, regulations and court cases, educated women today find many more avenues open to them. The absence of occupational segregation explains to some why there has been a long-term decline in the quality of public school teachers despite the significant progress made in raising their absolute and relative salaries.
- ¹⁸ Robert P. Strauss, et. al *Teacher Preparation and Selection in Pennsylvania* Table 5.7.
- ¹⁹ *Ibid*, Table 5.15.
- ²⁰ The state could simply stop subsidizing elementary education majors, for instance.
- ²¹ The key question from a public vantage point is why taxpayer subsidy should accompany the production of so many teachers who do not get jobs. The continued overproduction of elementary-school teachers is a case in

- point. Like most states, Pennsylvania's student body will be increasingly concentrated in the secondary grades, yet elementary education continues to be the focal point of most teacher preparation programs.
- ²² Note that Pennsylvania does not require prospective teachers to pass a Core Battery Test in math, although most other states do.
- ²³ Strauss, et. al, *Teacher Preparation and Selection in Pennsylvania Schools*.
- ²⁴ A positive correlation indicates that actual hiring tends to be greater from approved programs with higher NTE mathematics scores, and a negative correlation indicates that actual hiring tends to be greater from approved programs with lower median scores. The employment rate was measured by taking—by NTE subject area and certifying institution—the ratio of certificate aspirants with a known NTE score ever employed in a Pennsylvania school district or intermediate unit to the total number of certificate aspirants with known NTE score. See Strauss, et. al, *Teacher Preparation and Selection in Pennsylvania*, Tables 7.8-7.11 and 7.12.
- ²⁵ To be sure, one can also argue that the economic opportunities for chemists are greater outside teaching, so that districts were unable to find chemistry teachers except from programs which had very weak results. On the other hand, these data also show the effects of artificially limiting supply by insisting that would-be chemistry teachers be immersed in teaching methods courses, the core activities of many education schools, to the exclusion of taking actual chemistry courses. In any event, the data show that programs with weak chemistry teachers got more of them hired in Pennsylvania school districts than those with strong chemistry teachers.
- ²⁶ Robert P. Strauss, *Who Should Teach in Pennsylvania's Public Schools?* (Carnegie-Mellon University, Center for Public Financial Management, 1993): Table 5.2.
- ²⁷ See Strauss, et. al, *Teacher Preparation and Selection in Pennsylvania*, Table 7.14. This may explain why researchers have such difficulty demonstrating that higher spending is associated with greater student achievement: undisciplined hiring practices lead to highly variable student achievement results. I encourage the reader to look carefully at Table 6 and wonder along with me why advocates for school finance equity have not focused on these types of results rather than just on per-pupil spending.
- ²⁸ Only Philadelphia and Pittsburgh may impose residency requirements for teachers and school administrators; all other districts are prohibited from doing so.
- ²⁹ This stark weakening in the oath of office occurred at a time when Pennsylvania was consolidating its 2,500 school districts into 501, and eliminated oversight by County School Superintendents. The reader may find as undue my emphasis on the "civics" aspects of school governance. However, in the absence of strong ethical requirements against self-dealing it is difficult to envision why volunteer school board members, who typically devote in excess of 400 hours per year to these enterprises, would not get tempted to appropriate privileges to compensate them for their efforts, let alone not take advantage of the huge opportunities to take what resources are on the table without violation of law.
- ³⁰ Alternatively, districts may actively "trade" jobs with each other.
- ³¹ Several superintendents and a member of the Pennsylvania State Board of Education helped devise the questions in the questionnaire, some of which sought to elicit procedures, practices, and emphases in the hiring process which are consistent with nepotism models of teacher hiring.
- ³² This result compares favorably with William W. Cooley and Carol A. George, *Educational Indicators for Pennsylvania*, University of Pittsburgh, Learning Research Development Center, *Pennsylvania Educational Policy Studies* Policy Paper No. 14, 1995.
- ³³ Dale Ballou and Michael Podgursky (1997). *Teacher Pay and Teacher Quality*. (Kalamazoo: W. E. Upjohn Institute for Employment Research).
- ³⁴ See Table 13 in Robert P. Strauss, Lori L. Bowes, Mindy S. Marks, and Mark R. Plesko, "Improving Teacher Preparation and Selection: Lessons from the Pennsylvania Experience, *Economics of Education Review*, forthcoming.
- ³⁵ *Ibid.*
- ³⁶ National Commission on Teaching and America's Future, *What Matters Most: Teaching for America's Future* (Washington, D.C., Author, 1996), 29.
- ³⁷ To be more precise, the Pearson correlation coefficient between the fraction of high-school seniors in 1990 with post-secondary school plans and the fraction of teachers from NCATE-certified education programs in Pennsylvania was -.36 and the odds of this being due to chance were 0.0001.
- ³⁸ The NCATE-approved programs in Pennsylvania are basically the former normal schools which do not attract the best undergraduates. For many districts, the NCATE programs produce the most teachers and certificates, so it is easy for a district to find someone with a teaching certificate. In some parts of the state, they are the only producers of teachers. So, if a district does not advertise and look around aggressively, it will wind up taking what is nearby.
- ³⁹ On this point, see Hanushek and Pace, "Understanding Entry into the Teaching Profession" in Ronald Ehrenberg, ed., *Choices and Consequences: Contemporary Policy Issues in Education*.
- ⁴⁰ See Ruth Kolb and Robert P. Strauss, "A Survey of State Laws Governing School Board Ethics," paper presented at the American Education Finance Association Annual Research Conference, Seattle, Washington, 19 March 1999. [Heinz Working Paper 99-8]
- ⁴¹ Lack of state fiduciary oversight also enables those who initially handle local monies or contracts to add to their well-being. It is said in the publishing business that 5 percent is the usual "thank you" for having selected a particular textbook.
- ⁴² Remarkably, if one reads the Pennsylvania School Code, one finds very little reference to parents of school children, let alone their being stakeholders in the successful education of their children.

⁴³ For incentives to work properly, the children must face independent high-stakes testing so they do not simply choose the easiest graders or most popular teachers. Given rising academic standards in most states, this seems increasingly likely.

⁴⁴ After presenting this idea at the October 28, 1997 New York Board of Regents Symposium on Incentives to Achieve Higher Standards in Albany, New York, and a few public exchanges with the President of the New York Federation of Teachers, I was informed by one of the regional education managers (a BOCES superintendent) in upstate New York that the practice of formerly allowing parents to choose the teachers has worked well in Northern Minnesota along predicted lines. This is not that novel an idea, and in a sense merely ratifies what many aggressive parents insist on when they individually complain to local principals. To the market oriented who are not persuaded, the obvious question is why allowing choice among buildings (charter or voucher) is sensible, but choice *within* the building is not.