Teacher Preparation and Selection in Pennsylvania:

Ensuring High Performance Classroom Teachers for the 21st Century

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with the assistance of

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A Research Report to the

Pennsylvania State Board of Education

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Any questions regarding this *Report*, its methodology, data, or findings should be directed to Professor Strauss at the Heinz School. Phone: 412-268-4798; Email: RS9F@Andrew.CMU.EDU; Home Page: http://www.heinz.cmu.edu/~rs9f/. Responsibility for this paper and any errors rests solely with the author.

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This is the fifth in a series of research reports on public education in Pennsylvania I have developed at Carnegie-Mellon University. The first two studies [1] dealt first with measuring the differential access to advanced science and mathematics courses among secondary schools in Western Pennsylvania, and then developing alternative strategies which might improve access to such courses for poorer, smaller, and more remote school districts. The third[2] dealt with the adequacy of Pennsylvania's teachers across all grade levels, the ability of the State's various teacher certification programs to meet evolving teacher needs in the remainder of the decade, and the determinants of students' post-secondary educational plans.

The fourth monograph, completed on September 3, 1996 for the Vira I. Heinz Foundation August, continued the third line of inquiry with special emphasis on the selectivity of Western Pennsylvania's school districts in terms of the content knowledge of new hires over the last decade.[3]

Upon completion of the 1996 in depth study of teacher preparation and selection in Western Pennsylvania, I convened a series of meetings with Ms. Helen Caffrey and several other members of the Pennsylvania State Board of Education, and relevant stakeholders from the public education community. The meetings, held at Carnegie-Mellon through the Fall of 1996, discussed the research findings about teacher preparation and selection in Western Pennsylvania, and the implications for educational policy. As a consequence of these discussions, a series of follow-up research questions[4] were developed in conjunction with a Study Liason Committee of the State Board composed of Ms. Caffrey (Chair), Dr. Earl Horton and Mr. Karl Girton.

As the State Board intended to take up matters relating to teacher certification and program approval in the Spring and Summer of 1997, the research project was structured to assist them in their deliberations through calendar 1997. This *Report* represents the results of those efforts.

In January, 1997, the State Board of Education, at the request of the Study Liason Committee, approved funding of the research project. Ms. Caffrey, as Chair, ensured that our analysis, data collection, and briefings were relevant to the tasks they faced as the State Board considered Chapter 49 of the regulations governing teacher certification and program approval in Pennsylvania.

Upon completion of a first draft of this research monograph in early November, 1997, the Study Liason Committee formed a Strategic Reaction Panel, including Dr. Michael Poliakoff, Deputy Secretary for Higher Education, and representatives of a broad array of public education organizations[5]. The Panel was convened by the Study Liason Committee at Penn State-Harrisburg on November 13, 1997 at which time I briefed the Panel on the draft report and distributed it for their review. The Panel was also convened by the Study Liason Committee at Penn-State

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[1] See: 1) *The Mon-Valley Education Consortium: Improving Access to Science and Math*, (Pittsburgh, Pennsylvania: Center for Public Financial Management, School of Urban and Public Affairs, May 1989), and 2) *Establishing High School Advanced Science and Math Centers: A Feasibility Study for Allegheny Intermediate Unit 3*, (Pittsburgh, Pennsylvania: Center for Public Financial Management, School of Urban and Public Affairs, June 1990),

[2] See: *Who Should Teach in Pennsylvania's Public Schools?* (Pittsburgh, Pennsylvania: Center for Public Financial Management, H. John Heinz III School of Public Policy and Management, Carnegie-Mellon University, August, 1993).

[3] See *Public Education in Western Pennsylvania: Students, Teachers and Curricula through 2005: A Background Paper Prepared for the Vira I. Heinz Endowment.*

[4] See Chapter 12 which contains the research questions and solicitation to Pennsylvania's school superintendents, school board presidents, and local union presidents) about the structure of their personnel procedures.

[5] The Panel was composed of representatives from: the State Board of Education, the Pennsylvania Department of Education, the Pennsylvania Association of School Administrators, the Pennsylvania Congress of Parent and Teachers, the Pennsylvania Federation of Teachers, the Pennsylvania School Boards Association, the Pennsylvania State Education Association, the Professional Standards and Practices Commission, administrators representing public and private teacher preparation institutions, an area vocational-technical school, a representative of Intermediate Executive Directors, representatives from Pennsylvania Association of Colleges and Teacher Educators, and a science teacher from the Philadelphia school district.

Harrisburg on December 11, 1997 at which time the Panel provided their oral and written responses to the draft report to the Study Liason Committee and myself.

On January 14, 1998, I presented an overview of the report to the full State Board of Education, and the Study Liason Committee conveyed a series of policy recommendations on January 15, 1998 to the full State Board. Those recommendations dealt with a wide range of teacher preparation, program approval, and selection issues, and are reproduced in Chapter 13 below.

This *Report* reflects, consistent with the limitations of time, space, and resources, the comments and suggestions of the Study Liason Committee and State Board of Education, and, where appropriate, the comments of the Strategic Reaction Panel through January, 1998.

The project could not have been accomplished without the interest and support of many institutions and individuals throughout Pennsylvania.

The Vira I. Heinz Endowment, Grable Foundation, and Frick Fund of the Buhl Foundation provided a generous grant in support of the project which, in conjunction with financial support from the State Board of Education, supported the research, which built on the earlier work supported by the Pew Charitable Trusts. Dr. Joseph Dominic of the Endowment, Dr. Jane Burgher and Dr. Susan Brownlee of the Grable Foundation, and Dr. Doreen Boyce of the Buhl Foundation successfully shepherded through their respective organizations the idea of supporting university-based educational policy research for the State Board of Education. I am most grateful for their patience, encouragement, and support.

Within the Pennsylvania Department of Education, a number of individuals assured the project's steady progress. Dr. Gene Hickok, Pennsylvania's Secretary of Education, and Dr. Michael Poliakoff, Deputy Secretary for Higher Education, most generously provided access to their staffs and the administrative records of the Department, under a signed confidentiality agreement, which were essential to the project's success.

Special thanks go to Mr. John Senier, Research Associate in the Department, for his patience in helping me to understand Pennsylvania's public education system, and his extensive knowledge of the various data, its problems, and pitfalls, which are analyzed in this study. I hope that this statistical excavation of the Department's archives provides some new insight into the evolution of Pennsylvania's system of public education over the last decade, as well as provides insights which can inform public policy.

Mr. Ron Simonovich of the Bureau of Teacher Certification helped me understand the complexities of Pennsylvania's teacher certification and program approval rules, and the details of the various teacher tests which Pennsylvania requires.

Roger Hummel, Chief of the Division of Data Services, Denny Shomper, Chief of the Division of Systems Development, and Jean Hobaugh cheerfully provided the most recent archives of the Department of Education and explained their intricacies to me.

The project also benefited from extensive conversations with many local school officials across the State. Discussions with Dr. Jerry Longo, Superintendent of the Quaker Valley Schools, reinforced my sense of the centrality of the teacher selection process in improving public education in Western Pennsylvania. Discussions with Ms. Kathy Mullins, who is responsible for the Pittsburgh School District's personnel and certification reporting procedures, were also most helpful.

Dr. Mary Ann Marchi of Seneca Valley School District and Dr. Richard Pitcock of Mt. Lebanon School District provided candid reviews of the draft school district employment practices survey, and helped us understand the realities which school personnel officers face.

At Carnegie-Mellon University, Dr. Harry Faulk, Associate Dean for Executive Education and former superintendent of several Western Pennsylvania school districts for better than 25 years,

has been most generous over the years in explaining the theory and practice of Pennsylvania public education.

This project could not have been completed without the extraordinary work of three outstanding research assistants here at Carnegie-Mellon. In a matter of months, Lori R. Bowes and Mindy S. Marks became experts in the legal and regulatory details governing teacher preparation and program approval throughout the United States, and were responsible for Chapter 4. Mark R. Plesko cheerfully mastered the relevant computer environments, and enabled the project to move enormous amounts of data in new ways to answer the research questions posed by the State Board of Education. Importantly, they designed, implemented, and oversaw the data entry of the school district employment practices survey, the first of its kind in the U.S..

While many have provided their assistance to this study, as is customary, I must take final responsibility for its views, findings, and any errors.

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Chapter 1

Executive Summary

This *Report* is intended to provide the reader a comprehensive view of teacher preparation, program approval, and teacher selection practices both in Pennsylvania and in other states. Its major premise is that, due to changing student and teacher demographics, Pennsylvania has an opportunity to strategically improve the quality of its teacher force, as it retires, and as Pennsylvania raises its expectations of student achievement. Chapter 2 discusses the changing nature of state education policy, and the centrality of the quality of classroom teachers in improving educational performance.

Chapter 3 examines both the academic literature and state specific studies. Most of the academic literature dealing with the choice to become trained as a teacher has focused on the effects of expected compensation, and on the demographic composition and academic achievement of those seeking a teaching a career. There is relatively little attention to the hiring *decision*. Most studies which make projections of likely teacher demand focus on student demographics, and teacher demographics. There is a literature on the effect of stronger teacher content knowledge on the academic achievement of teacher's students. Studies which focus on quality as measured by National Teacher Exam scores or the number of courses taken in a subject matter field of concentration confirm the common sense notion that the better the teacher is prepared in subject matter, the better the teacher's students perform themselves. States which have higher percentages of their classroom teachers with college majors in their classroom teaching area, are states whose classroom students do better on standardized tests.

The teacher preparation and program approval rules in six states were examined in depth and compared to Pennsylvania. The states[1], identified by the Study Liason Committee, vary in terms of the nature of their requirements; however, several patterns are evident. First, more emphasis on state guidelines or specific requirements for admissions to teacher preparation programs, as contrast to voluntary guidelines adopted by each institution of higher education, is evident in the comparison states than in Pennsylvania. Connecticut's explicit minimum SAT score of 1000 as a condition for admission to a teacher education program is an example of such an admissions standard. Second, the comparison states either already have in place, or are in the process of adopting explicit subject matter requirements which obligate a prospective teacher to obtain a major in the intended subject matter teaching area. Pennsylvania's historical program approval standards are, by contrast, quite vague and do not ensure that prospective teachers are deep in their content knowledge.

Chapter 4 ends by providing a complete comparison of all states to each other in terms of their self-reported certification requirements. The National Association of State Directors of Teacher

[1] Arizona, California, Connecticut, Ohio, Virginia, and Wisconsin

Education and Certification tabulations are provided which compare the states across a wide variety of certification issues.

Chapter 5 describes the basic empirical features of Pennsylvania's public education system. Public school enrollment is expected to peak in school year 2000 at 1.811 million; secondary enrollment continues to grow as a percentage of total enrollment: from 43.8% in 1991 to 49.6% in 2005. This change in student enrollment has significant implications for future teaching needs, as does ageing of Pennsylvania's teacher force.

It is evident that far more teachers have been historically certified, over 500,000, than are currently employed in the classroom, about 100,000. Pennsylvania's teacher preparation institutions continue to certify far more elementary school teachers than can ever be hired within the state. Overall, on the order 20,000 new teaching certificates are annually being awarded, while less than 2,000 new teachers are being hired each year.

A very detailed analysis of future teacher needs is made through the use of a complex demographic simulation model. Projections by Metropolitan Statistical Area and area of certification are presented which show, under different teacher retirement assumptions, how many teachers will be hired between now and 2005.

These teacher demand projections are compared to the historical patterns of supply, and overall it is likely that the ratio of demand to supply, should teacher preparation institutions continue to train teachers at historical rates will be on the order of 10 to 30%. Thus, many who become certificated teachers in Pennsylvania will never be able to obtain a teaching position.

Chapter 6 examines in detail what is known about the standardized teacher examinations sold by Educational Testing Service to Pennsylvania, and comparison states. Several key findings emerge for Pennsylvania's standardized tests. First, the passing test scores, annually set by panels of experienced teachers in Pennsylvania, are very low, and as a result the fraction who pass these tests is very high (90% or better). Second, if one estimates the absolute knowledge which these passing scores represent, they reflect, for questions of average difficulty, correctly answering anywhere from 25 to 60% of the questions. Also, Pennsylvania's passing scores are not that different than other states.

If one compares the very high passing rates on these standardized teacher examinations with recent national and Pennsylvania experience with accounting and law certification examinations, it is evident that accounting and law are much more restrictive: only 32% passed some portion of the CPA exam; only 18% passed all parts of the CPA exam. No more than 70% nationally, and 48% in Pennsylvania passed the law boards.

Pennsylvania's language governing waivers from certification requirements was compared to provisions in Michigan. While Pennsylvania's language appears to be rigorous, it permits a local district to hire an uncertified teacher in place of a certified teacher for reasons unrelated to the suitability of the teacher in the classroom. In Michigan, waiver applications must demonstrate that the education of the children is at risk unless the waiver is granted.

Chapter 7 examines the issue of teacher quality, as measured by success on standardized content knowledge examinations. Quality is examined by teacher preparation institution, and extreme variations in content knowledge of certified graduates from Pennsylvania's institutions are found. Graduates from some institutions correctly answer only from 20% to 40% of questions on standardized tests, while graduates from other institutions correctly answer anywhere from 59% to 75% of questions on standardized tests. Tables are provided which rank institutions of higher education by the median test scores of their graduates.

Turning to the selectivity of local school districts, measured as the median teacher test score

of those hired in each specialty area, we find, remarkably, that there is no statistically significant relationship between the employment experience of graduates from various institutions (in Pennsylvania), and the teacher test scores of their graduates. Within metropolitan areas, there are huge differences in the content knowledge of teachers hired by districts in the metropolitan area, and huge differences across areas. Altoona's most selective school district hired a math teacher with median math NTE score of 610, while the most selective district in the metro Philadelphia area, had hired math teachers with a median math NTE score of 850. These test scores can be translated into correctly answering 49% versus 81% of the standardized questions. In Pittsburgh and Reading, the least selective districts hired math teachers who answered correctly no more than 35% of the standardized test questions of average difficulty. All of Pennsylvania's districts who hired more than one elementary school teacher in the last decade are displayed and ranked by the median teacher test score along with the per capita income of the community and teacher salary. Examples can be found of poor districts hiring high (or low) test score teachers at low and high salaries, and rich districts hiring low (or high) test score teachers at high and low salaries.

Chapter 8 reports the results of surveying each of Pennsylvania's 501 school superintendents, school board presidents, and union presidents in terms of their teacher recruitment practices, and the relationship of these practices to various measures of student achievement. About 1/2 of Pennsylvania's school districts do not have written hiring policies; many do not advertise widely about vacancies. Remarkably, 40% of classroom teachers in an average Pennsylvania district attended school there.

Where districts utilize more professional personnel procedures in their recruitment of teachers, student achievement is generally higher. Where more emphasis is given to matters of residency and non-academic matters, student achievement is lower.

Chapter 9 discusses conventional and unconventional reform strategies to improve the preparation, selection, and development of teachers in Pennsylvania. Conventional reform strategies include implementation of student testing, implementation of higher passing scores on standardized tests for teachers, more stringent program approval standards that specify content majors, especially for secondary school teachers, state specified admissions standards for teacher preparation institutions, and meaningful teacher development programs.

Unconventional strategies include dealing with the realities of independent local hiring procedures which do not obligate districts to hire the most highly qualified, and ways to think about professional development for those who will not soon be retiring.

Chapters 10-14 contain, respectively, the complete employment survey and letters of solicitation, Connecticut's program approval standards, communications from the Study Liason Committee to local school officials, the January 14, 1998 Study Liason Committee Recommendations to the State Board of Education, and Bibliography.

Chapter 2

Introduction

2.1 Some Preliminaries

As more states are testing their students to find out what they do and do not know, they are realizing that there may be limits to what can be reasonably expected from students unless curricula and classroom instruction reflect higher learning standards. Common sense suggests that raising our expectations about what students achieve in the classroom should be accompanied by concomitant policies and resources to improve what teachers know and convey to the students. By and large, however, legislative and regulatory reform of public education has focused on:

1. Developing tests or assessment tools to determine what students know and can do;
2. Promulgating information about these results to the public, parents and students; and
3. Developing financial rewards and penalties for districts, building level administrators, and teachers which are associated with student achievement levels (e.g., Michigan and New York).

Such accountability models presume that, faced by financial rewards and penalties, those in charge of local public education will adjust their activities in order to gain rewards and avoid penalties.

The public education system, however, is a very complicated set of large institutions which may react defensively to external criticism or externally imposed change. The result often is that public educators are unresponsive to systems of financial rewards and penalties unless great care (and courage) is taken to place these incentives at meaningful junctures of the public education system. The size, complexity, and static nature of the system probably explain why some favor side-stepping the frustrating problems of redesign by simply giving parents of school-age children vouchers to buy education services from whomever wishes to sell them. Whether parents will have adequate or sufficient information about these educational services providers to make wise choices for their children is usually not (openly) discussed. Advocates assert that such alternatives must be better than the current morass of public education.

Legislative battles in many states over charter schools or vouchers often center on whether or not the teachers in these new schools must be certificated like their public school counterparts. Debate often focuses on whether teacher certification, and education school coursework in particular, is necessary or sufficient to ensure effective classroom teaching. Underlying much of the debate over

charter schools or vouchers is often an (unstated) antipathy of teachers' unions, teacher tenure rules, unresponsive and bureaucratic school administrations, and local property taxes, which increasingly fall on homeowners. There is also considerable concern that US secondary students perform worse on standardized tests than their counterparts in other parts of the world.

To understand how policy changes can improve student performance, one must step back and examine public education's overall institutional architecture. Free provision of public education to school age children, who are required by law to attend some form of school, is typically a state constitutional obligation.

State laws in older, industrialized states typically create local school districts on a parallel basis to municipalities, and empower them to impose local real estate taxes which, in conjunction with state payments to school districts, are used to pay for school costs. Local school districts are also allowed to issue debt for capital purposes, are required to balance their budgets, and must report to the state on their financial activities. Typically capital activities (debt issuance and school construction) are heavily supervised by state agencies to ensure safety and proper use of funds.

State constitutions also typically require that imposition of any tax be through an elected council or legislative body. In the case of school districts, school directors serve *pro bono*, and act as the state legislature's agents in providing a thorough and efficient education. School director elections are often non-partisan which is in contrast to other local state and local elections where cross-over voting by voters with expressed political affiliation is prohibited.

While there are relatively few restrictions on who may serve as a school board director, the statutory and regulatory requirements about who may teach in a public school are very complicated and often very imprecise, and vary considerably across the states.[1] To be eligible to become a member of a school board in Pennsylvania, one need only be a citizen of Pennsylvania, a person of good moral character, 18 years or older, and have been a resident of the school district for at least one year prior to election or appointment.[2] Direct self-dealing is limited statutorily in several ways:

1. School employees are prohibited in Pennsylvania, under Act 2 of 1980, 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.[3]

2. School board members are prohibited under the School Code, Section 1111, from voting on the appointment of a relative to a teaching position on the board.

3. The Public School Code, Section 324, prohibits a school director from being interested in, or doing business, with the school district during the term of office.[4]

[1] See Chapter 4 for a detailed review of certification and program approval requirements.

[2] Act 138, June 16, 1972 reduced the age of a school director to 18.

[3] Only Philadelphia and Pittsburgh may impose residency requirements for teachers and school administrators; all other districts are prohibited from doing so.

[4] This prohibition is, however, only a direct prohibition, and does not deal with indirect issues of conflict of interest which might involve, for example, a spouse, relative, or friend engaging in business with the district in which the school director serves. ¶ 3-325 of the Pennsylvania Code prohibits a school director from receiving, directly or indirectly, monies as a consequence of voting on matters which come before the school board. Thus, by not participating in a vote on a contract decision, or delegating decision-making over financial matters to a superintendent, or other board members, a school board director is relieved from this prohibition.

Prior to 1968, the oath of office administered to elected school 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 non-performance of any act or duty pertaining to my office, other than compensation allowed by law. Effective

In Pennsylvania and most states, teachers, however, must earn educational credentials, have a college degree, pass certain standardized tests, and student teach. By and large, a college degree, which reflects coursework on pedagogy and the content area in which the prospective teacher will teach, in conjunction with passing scores on standardized tests, are what is required to become certificated. The degree is typically from a state approved program of teacher preparation, and standardized tests are devised by national testing firms such as the Educational Testing Service or National Evaluation Systems.[5]

Changes in student and teacher demographics, as well as rising expectations for student performance, are creating pressing classroom needs and the need to hire new public school teachers. In the older, industrialized states, school-age children will be relatively older in the next ten to fifteen years, thereby requiring more secondary than elementary classroom teachers. At the same time, classroom teachers are, much like the rest of our society, getting older, and retirements will provide an opportunity to hire younger, less expensive teachers, and hopefully those able (or better able) to ensure that students can achieve high learning standards.

Some have commented that these demographic changes should be recognized by teacher preparation institutions so that they can prepare teachers with the right skills for the classroom needs of the next century. However, higher education faces its own financial incentives, and also has its own rigidities which limit change. Colleges and universities with sizable education schools find it difficult to alter the activities of their own highly tenured faculties, some also unionized, to not only train the right sort of teachers, but also ensuring that those trained are able to help students achieve high learning standards.

Another aspect of higher education's struggle with its schools of education involves the cross-subsidization which education schools provide for other parts of their campus. Professional schools are often viewed with suspicion by other parts of a university campus, and schools of education perhaps fare worst. They are frequently viewed as profit centers to be taxed to support other programs. Admissions policies are then pursued which encourage many who would otherwise not attend college to prepare for a career in education which may never materialize.

Relatively little emphasis has been placed by educational researchers on the role of the local employment decision and the role of elected, volunteer school boards in responding to public demands for better student performance. An important exception to this generalization is the recent work of Ballou and Podgursky(1997a, 1997b), which examined national patterns of teacher recruitment. Their findings, which should be kept in mind during this review of Pennsylvania's rules and experience with teacher preparation and selection, were:

1. Higher teacher salaries have had little, if any, discernible impact on the quality of newly-recruited teachers.

2. The failure of this policy can be traced, in part, to structural features of the teacher labor market.

3. Recruitment of better teachers is further impeded by the fact that public schools show no preference for applicants who have strong academic records. (Ballou and Podgursky(1997a), pp. 163-4.)

November 22, 1968, the oath of office merely required affirmation to support, obey and defend the State and US Constitution, and discharge the duties of office with fidelity.

[5]As detailed in Chapter 6 and Chapter 7 these are minimal requirements, and often do not attract the most academically talented individuals.

While they go on to propose market-based salaries based on performance as solutions to these problems, my analysis of the public education problem focuses on the employment and personnel management *decisions* and the institutional/legal framework within which they are made for several reasons.

First, Pennsylvania, along with other states, accords a permanent teaching certificate quite early in the career of teachers. Even in states which no longer have lifetime certification, continuing education requirements, while numerous, are typically not onerous or sufficiently demanding to lead large numbers of teachers to leave the profession before reaching retirement. Second, evaluation of personnel in any professional organization is quite difficult, and especially so when one can not readily measure outcomes as in the private sector. Simply ascribing student achievement to the efforts of an individual teacher ignores the obvious reality that student achievement is cumulative and dependent on those who taught the student earlier, as well as the student's own intellect, motivation, and home environment. Third, given the aging of the teacher force, there may be an opportunity to raise the quality of the teacher force by improving both the teacher preparation process and the teacher selection process.

A teacher hired by a district, unless he or she chooses to leave voluntarily, is likely to be with the school district for a very long time. The employment decision, because it is a long-term decision, involves the long-term committment to pay salaries which will rise with or above the rate of inflation. Professor Hamilton Lankford at SUNY-Albany has pointed out that the sort of financial committment made at the time of hiring is on the order of $300,000 to $500,000 per teacher, well above the median home price of $125,000, a significant investment for home-buyers.

As shown below in Chapter 8, many districts do not pay enough attention to the personnel process, and make such $300,000 to $500,000 decisions on the basis of no more than an hour of consideration.

Pennsylvania currently is considering the implementation of high academic standards, and is among the first states to simultaneously consider raising the standards for teacher certification and program approval. Given that as many as 60% of the classroom teacher force[6], state-wide, may retire by 2005, Pennsylvania has a unique opportunity, in a coordinated manner, to both raise academic standards, and to develop a teacher force which through more stringent training, and professional development, can ensure that students, expected to perform at higher academic standards, will have the classroom instruction and curricula to make this a real possibility.

However, also as detailed below[7], unless employment and personnel decisions are made by local school boards with a focus on the ultimate objective of educating students, simply changing public school and teacher preparation curricula, the current definition of reform of the teacher preparation system, will do nothing to ensure that the most knowledgeable and effective individuals will be hired to teach.

The purpose of this *Research report* is:

1. To characterize Pennsylvania's professional school personnel over the past decade;
2. Project likely teacher needs under reasonable student and teacher demographic projections;
3. Identify ways in which the market for public school teachers can function more smoothly; and,
4. Assess, on a comparative basis, Pennsylvania's teacher preparation and selection procedures.

[6]See Chapter 5 for these projections.
[7]See Chapter 8.

The data developed below to address these issues are compelling and, frankly, rather distressing, for they raise questions about whether local control, the mantra of public education in the US, is capable of doing any more than ensuring mediocrity. When one looks closely at who gets hired to teach students and how they get hired and retained, much of the mystery and confusion about mediocre student performance disappears. How one changes this, however, is not easy, and is likely to be controversial.

2.2 Organization of *Report*

This *Research Report* was developed to be largely self-contained, and is organized as follows:

- Chapter 3 reviews much of the academic literature on teacher supply and demand, and evidence regarding the relationship between teacher quality and student achievement;
- Chapter 4 provides an overview of teacher preparation and program approval based on the 1996/7 survey of the National Association of State Directors of Teacher Education Certification (NASDTEC). Chapter 4 also reports the results of the project's own examination of original state source documents on teacher certification and program approval in selected states.
- Chapter 5 provides basic statistics on Pennsylvania's public education system as a backdrop to the analysis of teacher preparation and program approval standards and policy in Pennsylvania.
- Chapter 6 outlines the major features of teacher certification and program approval in Pennsylvania.
- Chapter 7 explores the quality of teachers prepared in Pennsylvania teacher preparation institutions and the selectivity of school districts in their hiring practices.
- Chapter 8 reports the results of an extensive survey of school district employment practices in Pennsylvania and the correlates of various procedures and practices with various measures of district level student achievement and post-secondary education plans.
- Chapter 9 summarizes the stylized facts and their possible implications for educational policy viz. a viz. teacher preparation standards, program approval, and the standardization of employment practices by local school boards in Pennsylvania.

It should be noted that what follows is heavily empirical. That is, assertions of characteristics of the inventory of Pennsylvania school teachers, teacher preparation, and hiring practices are documented through the provision of tables to the extent that such data can be presented without violating confidential requirements under which the data were obtained. While some readers may find the provision of district level or university level detail overwhelming and perhaps unnecessary, others may find the specificity useful and compelling. It is not my intention in providing such detailed information to embarrass these institutions, rather it is to reveal the areas where improvement is needed.

Chapter 3

Other Studies of Teacher Supply and Demand, Training, Quality, and Hiring

3.1 Introduction

The study of teacher preparation has occupied educational researchers and labor economists for many years. Virtually all recognize the importance of current and expected student demographics in affecting enrollment patterns, and in affecting schools' decisions to hire teachers. Most also recognize, either implicitly or explicitly, that the decision to become a school teacher is made by students when weighing alternatives, in terms of both their pecuniary and non-pecuniary aspects.

To the extent that one can generalize, most educational researchers have tended to enquire if there will be sufficient numbers of primary and secondary school teachers under various assumptions; several have raised issues of the quality of the current and prospective teacher force. Others have examined such behavioral issues as the effects of relative and absolute salaries on the decision to become a teacher viz a viz other professions requiring a BA degree, and the effect financial incentives have on the retention of the teaching force. A few have wondered about the effects of differing quality in classroom teachers on the educational outcomes of students.

Also important is the training provided to those teachers by teacher preparation institutions, and the quality of teachers those institutions are producing. Others have investigated aspects and qualities of teacher preparation which are useful in creating quality teachers. Paramount to the discussion regarding teacher quality is measuring teacher quality. Researchers have debated the balance between pedagogy skills and content knowledge in an effective teacher. That balance has not been documented, but others have examined the usefulness of teacher test scores on content and general knowledge examinations in predicting student achievement. Furthermore, few have examined the essence of estimating teacher quality - the hiring decision made by school districts.

Our purpose in this review is to accumulate models, methodologies, hypotheses, and empirical findings so that we can develop several Pennsylvania teacher supply and demand models, and provide a set of issues to be addressed with these models. Below, we review studies of teacher recruitment and supply, studies of teacher retention, studies of student demography and teacher demand, state-specific studies, studies of teacher preparation and quality, and studies of teacher hiring.[1]

[1]This Chapter is an updated version of Chapter 3 of Strauss(1993). For another review of the educational research literature, which focuses on the social origins of teachers, see Darling-Hammond and Sclan(1996).

3.2 Teacher Recruitment and Supply

Much of the initial post WWII research on teachers was suggested by Kershaw and McKean (1962) who examined national teacher recruitment issues. They examined how a standardized salary policy developed in the teaching profession, and contrasted this with salary differentials for different specialties in other professions. They concluded that fixed starting salaries in teaching might cause a shortage of teachers in certain specialties as alternative, higher paying opportunities outside of teaching attracted college students at the margin. They suggested differential starting salaries for different teaching subjects as an economic remedy to these projected shortages.

In a similar study, Zambala (1979) examined English data with an econometric model of occupational choice and found that starting salary was the most important variable affecting occupational choice.

Schlechty and Vance (1983) summarized a series of papers on teacher recruitment and selection. Their own works, e.g. (Vance and Schlechty (1982), Schlechty and Vance(1981, 1982)), and Pavalko(1970), Sharp and Hirshfield(1975), are cited to support the view that lower quality students choose public school teaching as a career, and that the teacher retention rates are worst for the most academically gifted. They also expressed concern that major research universities are phasing out teacher training programs and, as a result, the majority of teachers are "...produced with the lowest academic standards." (p.486, 1983). They recommended that professors at high-prestige campuses "...turn their interest away from teacher education and toward the development of healthy management systems in schools."(p. 486). Remarkably, they also argued that "..weaker institutions of higher education should acknowledge that they served an important function that is no longer required."(p.486).

Weaver (1983) constructed a national simulation model of teacher supply and demand based on his own as well as other researchers' parameterizations. Of particular concern was the relatively low SAT scores of those choosing to teach. He tests four different reform alternatives using a system dynamics model which he developed earlier. He proposed providing job alternatives to education graduates in order to attract college-bound students to teacher certification programs even when there is a chronic oversupply of teachers due to falling enrollments.

Cagampang, Garms, Greenspan, and Guthrie(1985) examined various sources of teacher supply in California's school districts, and the implications of California's rapidly expanding student enrollment. Between 1985 and 1995, California's school districts are expected to experience a 26.5% increase in student enrollment; primary school enrollment is expected to grow during that period 32%, and secondary school enrollment is expected to grow 14.4%.

They developed the demand for teachers based on state projections of enrollment at the county level. They then noted that student-teacher ratios vary widely across the state, as does enrollment growth. Two different scenarios for attrition were examined: the first used *average* historical attrition and retirement rates from the California State Teachers' Retirement System (7.67% per year), the second used a time trend of attrition rates (falling from 7.07% in 1984/5 to 5.56% in 1994/5). They found, paradoxically, that while enrollment had increased in California's certification programs, the number of certificates issued fell.

In the early 1980's, about 4,700 teachers graduated per year; about 50% of them entered teaching. The implementation in early 1983 of the California Basic Educational Skills Test, a teacher skills test, reduced teacher supply both from California certificating institutions and from out of state. They estimated that there were 167,000 teachers with valid credentials not currently teaching, but that no more than 30% were likely to re-enter teaching.

Overall, they predicted that unless state policy changed drastically, maintenance of current

student-teacher ratios and the projected supply of new teachers and their attrition would yield a predicted teacher shortfall of 4,000 to 7,000/year through 1990.

Manski (1987) examined 22,652 high school seniors surveyed by the 1972 National Longitudinal Survey to model the relationship between academic ability, earnings, and the decision to become a teacher. He concluded that among bachelor's degree holders, there was an inverse relationship between academic ability and the frequency of the choice of teaching; conditional on sex and academic ability, the earnings of teachers are lower than those of college graduates. Academic ability (class rank or SAT scores) explains only a small portion of earnings. Furthermore, given academic ability, there are very few gender differences among teacher salaries.

Increases in salary would increase the size of the teaching force, but may not improve the overall quality of teachers as both high and low ability students are attracted into teaching. Manski reported aggregate wage elasticities of the teacher supply from +2.4 to 3.2, depending on the size of salary change. If teacher salaries are not increased, institution of a minimum ability standard could improve the average ability of the teaching force but reduce its size. Hence, Manski suggested that a higher minimum ability standard for teachers be combined with salary increases to improve both the quality and quantity of the teaching force.

Hanushek and Pace(1995) examined entry into the teaching profession as a sequence of decisions. Using longitudinal data from High School and Beyond, they traced the development of career goals, the choice of college major, and the characteristics of those who ultimately teach. They found that white females are more likely to become teachers than males or ethnic minorities; lower ability students are more likely than higher ability students to enter teaching. Interestingly, they found that state certification tests lower the rate of teacher preparation as do increased course requirements. Also they did not find that teacher salaries or relative salaries had substantial or statistically significant effects on students' decisions to enter teaching.

3.3 Teacher Retention

Murnane, Singer and Willett (1988) examined national panel data on teacher attrition over 12 years with proportional hazard models (breaking the sample into smaller groups and finding survival rates for each group, then putting them together to forecast future quits in the late 1980s). They found that younger women and elementary teachers were the most likely to quit. They also suggested that quit rates were lower in the 1980s because of demographics, but they fell short of predicting what quit rates would be in the 1990s, except to say that each teaching subject has different quit rates.

In a later study,(1989), they performed a similar analysis using data for the 5,863 teachers who were first hires in North Carolina between 1976 and 1978. The results from this study basically reconfirmed the results of their study using NLS data.

Murnane and Olson (1990) used an econometric model, developed by Olson and Wolpin (1983), to find the coefficients of the probability density function for the expected length of the teaching spell before quitting for 13,890 white North Carolina teachers hired during 1975-84. The sample was divided into two periods from 1975-79 and 1980-84 (no statistically significant difference was found for both periods though) and once again, it was found that different teaching specialties involve different teaching spells. Chemistry/Physics teachers were most likely to quit, while elementary teachers stayed the longest. They also found that a higher NTE score meant a higher probability of quitting while a higher salary meant a lower probability of quitting. These results were consistent with Schlechty and Vance(1983), and Manski(1987).

Grissmer and Kirby (1991) studied teacher attrition in Indiana. They examined panel data covering 24 years (from 1964-65 through 1988-89) on Indiana public school teachers and found that attrition rates have fallen over time. For teachers under 30, the attrition rates ranged about 15-25%, while the attrition rates of those over 30 were only about 2-4%. Hence, with the first three factors contributing to an older and more stable teaching force, attrition rates are expected to decline. However, the attrition rates have fallen to extremely low levels in the 1980s, and Grissmer and Kirby do not expect them to decline any further in the 1990s.

They proposed that the attrition rate observed in the 1980's could be expected to decline in the 1990's due to five factors: 1] the increasing labor force participation of women, 2] aging of the present labor force, 3] increased entrance of older women, 4] declining student-teacher ratio and 5] increase in teacher salaries. Also, Grissmer and Kirby found that different teaching certification areas have different attrition rates.

3.4 Student Demography and Teacher Demand

The next two studies dealt with teacher demand based on enrollment forecasts by Ahlberg (1982, 1985). He found that changes in enrollment were actually more pronounced than the projections by the National Center for Educational Statistics. Hence, he expected the over-demand/supply of teachers to be worse than other studies using NCES projections predicted.

However, Stapleton (1989) argued that this fear was unfounded. Using the example of the market for academic economists, Stapleton found that demographic models often exaggerate the potential shortage or oversupply of teachers. These demographic models suffer from four problems: 1] inadequate data, 2] poor modeling of the behavior of educational institutions, 3] inaccurate long range projections and 4]a lack of convincing evidence of market failure.

Zarkin (1985) applied the rational expectations model of Muth to the decision to become a teacher. In his model, prospective teachers take into account expected starting salaries and expected future demand conditions. He found that expected demand affects the decision to acquire secondary school certification, but not elementary school certification; the elasticity is 2.59. The number of primary school children enrolled in school prior to the teacher's employment are significant which is consistent with a myopic model of the labor market; on the other hand, the number of lagged secondary school children is unimportant in predicting the choice to become a secondary school teacher. Future children are unimportant in the decision to become an elementary school teacher.

Because he estimated a stock adjustment model, he found that the lagged effect of teachers was fairly large. He also found that the higher the present value of the opportunity wage, the lower the number of certificates awarded; the elasticity with respect to secondary school certificates was -1.18 and -.17 for primary school teachers (but not statistically significant). Zarkin then compared his rational model to a myopic, cobweb model used by Freeman and Leonard(1977); he found that both explain 97% of the observed variance in secondary school certificates issued, but they implied very different dynamics.

3.5 State-Specific Studies

Kirby, Grissmer and Hudson (1991) examined the success of the Indiana Beginning Teacher Internship Program in increasing the teaching spells of entrants, while Kirby, Hammond and Hudson (1989) found that non-traditional programs preparing non-education degree holders to enter teaching varied in their success in preparing these recruits to teach. The programs could not fully

overcome other attributes of teaching that made recruitment and retention of teachers difficult. However, in this project, we consider entrants from all types of teacher certification programs, regardless of whether it is traditional (B.Ed.) or non-traditional (degree in other field with a certification in teaching). That is, we do not distinguish between programs at this level, but only whether or not the institution preparing new teachers is public or private.

The 1987 Massachusetts Institute for Social and Economic Research (MISER) study of Massachusetts teacher supply and demand simulated teacher demand and supply by matching enrollment forecasts and course taking behavior to the records of public school teachers, hiring activities of school districts, and teacher certification applicants in Massachusetts, along with a survey of 41 of the 47 teacher certification programs in the state. However, the MISER study did not make predictions at the school district level.

The MISER study found that despite an aging labor force, the low hiring rate for newly-certified teachers (10-15%)is likely to continue. The Massachusetts study also found that the hiring rate for teachers trained in public institutions was slightly higher than that of private institutions, though not significant statistically. It also examined supply and demand of teachers for each different subject and forecasted that there may be a shortfall of secondary teachers in English, Mathematics, General Science, Social Studies, French and Vocational Studies in the 1990s, with a present under-supply of bilingual teachers.

More relevant to the evolving situation in Pennsylvania is the study, *Teacher Supply and Demand, 1989/90 and 1990/1*, released by the Pennsylvania Department of Education in August 1992. Based on a review of the most recent pattern of new teacher hires compared to the supply of new teachers on the production of new certificates by Pennsylvania certificate-granting institutions, it concluded that "...there appeared to be a more than adequate supply of certified teachers to meet the demand for classroom teachers."(p.14).

Strauss(1993) constructed demographic models of the demand for classroom teachers, which took into account the age distribution of enrolled students, the curricula offered in each building throughout Pennsylvania, and the age and experience of classroom teachers. Also, voluntary quits were examined, and the implications of "best-practice" curricula in possible hiring needs. Simulation analysis under alternative teacher retirement assumptions led to the prediction that between 1993 and 2005 as many as 53,500 new classroom teachers, out of an employed stock of 100,000, might need to be hired to maintain historical relationships.

Strauss(1993) also investigated the responsiveness of the supply of Pennsylvania primary and secondary teaching certificates to expected student enrollment and real wages. Taking into the account of the Vietnam draft, the long-run supply elasticity of primary school teachers with regard to the real wage was 1.2, and .35 for secondary teachers. Behavioral models of the retirement and quit decision were also estimated, and the effects of salary, and the academic achievement of their students. Higher absolute and relative salaries for older teachers delays, considerably, the decision to retire, while lower test scores of students encourages earlier retirement.

Examination by Strauss(1993) of the post-secondary educational plans of high school seniors across districts indicates a variety of factors which influence the decision to seek post-high school education:[2]

1. the greater the 8'th grade academic competency of the district, the more likely more education will be pursued;

[2]See Chapter 8.

2. the higher the poverty level of students in the district, the less likely more education will be pursued;

3. the larger the proportion of the district's teachers are from the State System, the less likely that more education will be pursued;

4. the greater the availability of academic coursework at the secondary level, the more likely that more education will be pursued.

3.6 Teacher Preparation

Paramount to the discussion regarding teacher selection and student achievement is the examination of teacher training and preparation. The 1996 Report of the National Commission on Teaching & America's Future (NCTAF) suggested that problems with teachers rest in their inadequate training. It advised that all teacher preparation institutions should conform to the accreditation standards of a body such as the National Council on Accreditation of Teacher Education (NCATE). However, the Baccalaureate and Beyond Longitudinal Study (1994) found few differences between recently trained NCATE and non-NCATE teachers. Percentages of teachers applying for teaching jobs and ratings of how members of each group felt about their preparation to teach were quite comparable between NCATE and non-NCATE teachers. Also, more selective universities and small liberal arts colleges are often among the institutions least likely to have sought NCATE approval.[3]

Another issue relevant to teacher preparation is the debate over the process of teaching versus the content of teaching. Public Agenda (1997) examined how professors in schools of education view the responsibilities of teachers. When asked: "When teachers assign kids specific questions in such subjects as math or history, is it more important that: kids struggle with the process of trying to find the right answers or that kids end up knowing the right answers to the questions or problems?" eighty-six percent said it was more important that kids struggled with the process of trying to find the rights answers. Their belief is that an emphasis on the process of learning will enable teachers to properly engage their students in the classroom. Asserting the importance of pedagogy, NCTAF recommended that teachers need more coursework in the pedagogy of certain disciplines, such as the teaching of biology, as opposed to more coursework in those disciplines themselves. Clearly, there is some balance between content knowledge and pedagogy skills in creating an effective teacher. However, research has failed to uncover that balance.

The Holmes Group (1986) advocated a bold restructuring of teacher education programs, and recommended that undergraduate teacher education programs be abolished.[4] Teachers, instead, would be required to have a liberal arts major or a subject major in their field of teaching. They also suggested that eliminating education majors without improving academic subjects would be a mistake, and recommended that future teachers should study subjects under "instructors who model fine teaching and who understand the pedagogy of their material" (1986). They further criticized the series of disjointed and fragmented coursework many prospective teachers must endure while preparing for teacher certification.

[3]See Ballou(1996). If one correlates at the district level the fraction of high school seniors expressing post-secondary educational plans and the fraction of a district's teachers from NCATE accredited institutions, one finds in Pennsylvania data an inverse correlation of -.36 with the odds of this being due to chance of less than .0001.

[4]It should be noted that the Holmes Group is composed of deans of the top research oriented schools of education throughout the US.

3.7 Teacher Quality and Student Achievement

Clearly, a teacher's ability to be effective rests in their ability to impart information, as well as in the body of knowledge they possess about the subject. While a single test score may be inadequate as an indicator of person's ability to teach, there is research which indicates the usefulness of teacher test scores and subject preparation in affecting student achievement.

Other measures which attempt to capture the complexity and richness of teaching are extremely subjective and difficult to capture on any sort of larger scale.

Educational Testing Service's National Teacher Examination (NTE) and its successor, PRAXIS, are the most widely used standardized tests for prospective teachers. Consisting of a series of Core Battery test and Specialty Area tests, the tests strive to measure academic skills which have been acquired in teacher training programs. Many caution that, as such, the test is limited in what it suggests about the teacher's ability to apply those skills in the classroom.

There is a small academic literature on the effect of teacher quality and substantive preparation on student performance in the US.

In an examination of the statistical relationship between NTE scores and student competency and student achievement in North Carolina, Strauss and Sawyer(1986) found very strong evidence of a sizable link between core battery NTE test scores and 11th grade reading and math competency and achievement scores.[5] In that study, a 1% relative increase in the average of core battery scores at the district level was associated with a 3 to 5% relative decline in the fraction of students who fell below grade level in reading and math; this result was after controlling for ethnicity, student teacher ratio, college going plans, and per capita income of the school district.

Webster (1988) found a significant relationship between teachers' scores on the Wesman Personnel Classification test, a test of verbal and quantitative ability, and middle school students' scores on the Iowa Tests of Basic Skills.

Loadman and Deville (1990) demonstrated a stronger relationship between between ACT scores and NTE, then between GPA and NTE. One interpretation of this empirical relationship is that teacher preparation institutions may not be adding particular value through approved courses of studies.

Ferguson(1991) found a similar relationship, although not as large, between measures of teacher quality and student achievement in Texas, and Ferguson and Ladd(1996) found similar relationships in Alabama.

As noted above, Strauss(1993, ch. 8) found in an investigation of Pennsylvania school districts that high school seniors, in districts which had larger fractions of teachers drawn from the State System of Higher Education, tended not to go on to post-secondary education compared to high school seniors in districts which had larger fractions of their teachers drawn from out-of-state, private, and state-related institutions. This result obtained after controlling for the curricula the students took, their socioeconomic background, and earlier test score results on 8'th grade competency tests.

Monk and King (1995) investigated the effects of subject-specific teacher preparation on student performance in secondary math and science. They used the Longitudinal Study of American Youth (LSAY) to survey American middle and high school science and mathematics students. They selected 2,831 students enrolled in the tenth grade in the fall of 1987 from fifty-one randomly selected localities in strata that were defined by geographic region, and community type. Sixty tenth-grade students were randomly selected from each school. The investigators used the National Assessment

[5] See Strauss and Sawyer(1986).

of Educational Progress (NAEP) to assess student capabilities. With respect to the teachers, the investigators surveyed the number of undergraduate and graduate courses in mathematics, life science, and physical science. Additionally, the investigators distinguished among proximate teacher, and previous teachers, as well as the set of all subject-matter specialists in the school in hopes of coming to a conclusion about the effect of the overall climate of expertise in the school, and the influence of previous teachers in terms of preparing the student for future learning in the subject. Their results indicated a significant effect of teacher preparation on the regression coefficient for achievement in mathematics. "The intercept coefficient for those students whose sophomore-year teacher possessed relatively high levels of subject-matter preparation in mathematics (more than 9 mathematics courses) was 10.61 ... while the corresponding figure for juniors whose sophomore-year teacher possessed relatively low levels of subject-matter preparation was 6.82" [6].

Having one more semester of a mathematics course translated to a 1.5 percent improvement in performance, independent of the student's initial pretest score. The results for science were less conclusive in that there was little evidence of a cumulative effect of preparation level of a student's previous teachers. However, for low-pretest students, the investigators found a positive effect of the mean level of physical science preparation embodied in the school's faculty as a whole.

In most states, teacher certification requirements including the minimum passing requirements for teacher examinations are set by State Education Departments. In contrast, however, other professional fields such as law, medicine, and accounting follow the testing standards enforced by professional boards of practitioners. These boards set standards at a much more rigorous level.

NCTAF and others respond to the lack of proper systematic evaluation of the pedagogical aspects of teaching by advocating board certified tests with broader tests of ability.

3.8 International Comparisons of Teacher Preparation and Certification Standards

Bishop(1996) reviewed the evidence on teacher preparation standards in the US vs. France and the Netherlands, and the performance of high school students on international achievement tests, and emphasizes the far more selective nature of teacher preparation programs overseas. In France, for example, only 31% who took the general teacher certification exam *passed*, [7], while even fewer (only 17.7%) passed a more rigorous exam.[8]

3.9 Teacher Hiring

Some evidence suggests that school districts are not hiring the best teachers available to them. Smith (1992) examined the criteria used in hiring first-time teachers. He mailed questionnaires to 652 administrators in 302 school districts in five midwestern states. He found that administrators ranked personal traits, such as enthusiasm, dependability, and the ability to work with others, as the most important consideration, followed respectively by professional traits, academic preparation, professionally related experience, and work experience. As noted earlier, Ballou and Podgursky (1997) provide empirical evidence that graduates of more selective colleges are worse off in terms of the probability that they will be hired into teaching positions.

[6] Monk and King(1995, p.46)

[7] In particular, only 31% passed the *Certificat d'Aptitude au Professorat de l'Enseignement du Secondaire*

[8] In particular the *Aggregation Externe* had a pass rate of 17.7%.

3.10 Interstate Relationships between Student Achievement and Teacher Quality

Most recently, educational researchers have emphasized the importance of teachers having a college major in the area in which they teach. Table 3.1 displays correlations across the states between this measure of teacher quality and several different measures of educational competency as indicated on state scores on the National Assessment of Educational Progress (NAEP) and the fraction of high school seniors going on to post-secondary education. The NAEP scores are measures as the percentage of students testing *below* grade (4'th or 8'th) level, so that lower scores are indicative of greater student competency. Column (7) indicates the fraction of students in classes with fewer than 25 students. These simple correlations indicate that the more often teachers have college majors, the lower the student incompetency in math and reading at fourth or eighth grade levels.[9]

Note also that states with greater fractions of teachers with college majors in their teaching area are also states in which greater proportions of high school seniors go on to some form of post-secondary education.

[9]The row underneath each correlation coefficient indicates the probability that the correlation was due to chance rather than systematic statistical relationship.

Table 3.1: Effects of % Teachers with A Collegiate Major in their Assigned Course on Students Testing Below Grade Level and Postsecondary Enrollment: Correlations across the States

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
	Math-4	Reading-4	Math-8	% PostSec	% Major	% < 25
Math-4	1.0000	0.8921	0.9630	-0.0434	-0.5471	-0.2230
Odds	0.0000	0.0001	0.0001	0.7875	0.0002	0.1605
Reading-4		1.0000	0.8632	-0.0550	-0.5426	-0.4458
Odds		0.0000	0.0001	0.7396	0.0004	0.0045
Math-8			1.0000	-0.0344	-0.5088	-0.1520
Odds			0.0000	0.8309	0.0007	0.3429
% PostSec				1.0000	0.4006	-0.0948
Odds				0.0000	0.0039	0.5125
% Major					1.0000	0.0532
Odds					0.0000	0.7139
% < 25						1.0000
Odds						0.0000

Source: Analysis of NAEP data and Education State level data.

The size of the relationship between these educational outcomes and teacher quality is displayed in Table 3.2. A 1% relative increase in teacher quality is associated with about a 1% relative decline in fraction of students performing below grade level (or 1% relative increase in student competency) in math at 4'th and 8'th grade levels, and .85% in 4'th grade reading levels. About 1/3 of the variation in student competency is explained by this teacher quality measure. Note the class size measure is only related to improving reading at the 4'th grade level (<25%.)[10]

Table 3.2: Effect of 1% Relative Increase in % of Teachers with Collegiate Major in Teaching Area on Failure Rates in Reading and Math, and Post Secondary Enrollment

(1)	(2)	(3)	(4)
	Effect of 1 % ↑ Degree	Odds	R^2
Math-4	-1.046	0.001	0.326
Reading-4	-0.850	0.002	0.376
Math-8	-1.183	0.001	0.301
% Post Sec.	0.422	0.003	0.237

Source: author's calculations with data from Sept., 1997 Education Week Special Supplement.

[10]The estimates in Table 3.2 are from a double natural log regression; Column (2) of Table 3.2 is the slope of the relationship the natural log of the output measure and the natural log of the various quality measures. Technically, the slope is the elasticity of effect.

Chapter 4

Teacher Preparation and Program Approval in Other States

Lori R. Bowes and Mindy S. Marks

4.1 General Features of State Teacher Licensure Procedures

Systematic certification of public school teachers dates back to the 19th century in virtually every state and, in New York, predates the Civil War. Ellsbee, writing at the close of the Great Depression noted six trends in teacher certification since the opening of the 20th century:

1. The centralization of the licensing function in the state department of education;
2. The substitution of approved training for teachers' examinations;
3. The differentiation of certificates according to the nature of the student's preparation, and the abandonment of blanket licenses;
4. The gradual abolition of life certificates;
5. The raising of training levels for all types of teaching certificates, with some inclination to make four years of training above high-school graduation the minimum for teaching in an elementary school and five years the minimum for teaching in a secondary school; and
6. The requirement of a certain number of specialized courses in education in the candidate's program of studies.[1]

In the 59 years since Ellsbee noted these trends, fashion and practice in a number of these areas have changed. For example, teacher testing has become widespread since the mid 1980s and is used in conjunction with teacher preparation program approval, and central licensing within state departments of education has been replaced in some states by independent licensing bureaus which report to state legislatures and are independently funded.

State agencies have evolved to deal with:

1. The definition of what an acceptable college is;

[1] Ellsbee(1939), p. 337.

2. What array of general college courses are required;
3. What is an acceptable major and/or minor;
4. What types of field experiences are required prior to practice teaching;
5. What are the requirements for the student teaching experience;
6. What are the requirements for non-teaching occupations typically present in the school building;
7. What is the definition of core areas of teacher knowledge which are tested through standardized examinations and the determination of passing scores;
8. What is involved in the introduction and hiring of professional school personnel;
9. What are ongoing professional development requirements;
10. What are the procedures for revocation and suspension of certification;
11. What are state procedures for record keeping, sharing of personnel records with local school districts, and the maintenance of teacher privacy; and
12. What are the standards for program approval.

In addition, the states provide various procedures for the temporary waiver of certification requirements through the issuance of emergency (temporary or limited term) certificates, and the recognition of teaching certificates earned in other states.

In the following sections, the legislation of Pennsylvania, Arizona, California, Connecticut, Ohio, Virginia, and Wisconsin regarding program approval and teacher certification is summarized. These states were chosen at the request of the Pennsylvania State Board of Education because of their similarities to Pennsylvania in terms of population and economic characteristics or because of recent education innovations and developments occurring in that state.

Considering the wealth and varying structure of legislation in these states, an accurate and current portrayal of the information is a daunting task. The objective in characterizing these states is to provide comparisons between the legislation adopted to address teacher certification. As such, these state presentations are divided into broad areas of program approval, teacher certification, and alternative certification, and are intended to illustrate differences between the states rather than serve as an exhaustive description of each state's regulations.

States differ markedly in the aspects of teacher certification which they regulate, and the extent to which they regulate it. For instance, there is marked variation in the amount of oversight states choose to exhibit over coursework for teacher education. With regard to teacher preparation institutions, some states, such as Ohio, require that all institutions meet the stipulations of a national accreditation body, such as NCATE. Others, like Connecticut, have developed rigorous program approval standards with specific objectives and evidence that regulators need to see. Alternative certification, whereby professionals may follow alternative routes to becoming teachers, has met with varied acceptance in different states. It is one indication of the extent to which qualified individuals with strong subject-matter preparation are permitted to bypass much of the pedagogical training undergone by teachers, although many states stipulate that their teaching is overseen by qualified teachers. The implementation of academic standards can also have consequences for teacher certification.

4.2 Pennsylvania

Pennsylvania[2] is in the process of revising Chapter 49, the statute which governs teacher certification. This document does not include these proposed changes.

4.2.1 Program Approval

Programs may be reviewed at any time but reviews must be conducted at five year intervals. Approval of an experimental program is allowed provided a detailed explanation of the program is submitted to the Department of Education, and a thorough procedure has been confirmed, which conforms to accepted canons of educational research, for evaluating the results of the program.

General Standards: Major Features[3]

1. Standard II: The institution's education faculty shall have experience at the elementary, secondary, supervisory or administrative level commensurate with the candidate's area of study.

2. Standard V: The institution shall develop, implement and evaluate a list of competencies to be achieved by persons who complete the program. Suggestions of competencies are not given.

3. Standard VI and VII: The institution shall document policies for admission into, retention in, and completion of a program. Once again no suggestions are given as to what these policies are, nor are there minimum requirements set.

4. Standard IX: The institution must encourage non-traditional students.

5. Standard X: The general education component of a certification program shall be supportive of the professional preparation program. The general education program 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.

6. Standard XI: Student teaching experience should be no less than 12 weeks in duration with field and clinical experience beginning in the sophomore year.

7. Standard XIII: The program will address issues of diversity and multiculturalism.

8. Standard XIV: The instructional certification program shall require professional studies in methodology including numerous listed topics. Examples are human development, historical issues in education, developmental reading and reading in the content area, instructional resource identification, and computer literacy. Students shall demonstrate proficiency in all of the above areas.

Standards Governing Instructional Certificates

[2]The main resources for this section are the Pennsylvania Certification Manual: Certification and Staffing Policies and Guidelines (CSPG), the Pennsylvania Department of Education Standards, Policies, and Procedures for State Approval of Certification Programs and for the Certification of Professional Educators for the Public Schools of Pennsylvania (SPP), and http://www.cas.psu.edu/docs/pde/teachcert.html

[3]SPP pp. 9-11

Each field/area has its own set of standards. Below are the complete texts for Biology and Elementary Education to provide examples of the requirements, with respect to content knowledge, and leading to graduation from an accredited program. The mathematics standards can be found in Section 6.4. Note that when compared to several other states examined in the following sections, Pennsylvania's program approval language is vague. It seldom stipulates semester hour, degree, or course requirements.

Biology[4]

The program shall require studies:

- Of and experience with living materials in laboratory as well as field experiences using investigation, inquiry, and experimental methods;
- That provide analyses of the characteristics of organisms such as cellular biology, homeostasis, systematic, behavior, reproduction-embryology, genetics, evolution and ecology;
- Of the interrelationships of organisms with the biotic and abiotic factors in their environment;
- Of and experiences in general chemistry, organic chemistry, biochemistry, physics, earth science, and mathematics as they relate to Biology. There are no set semester hour requirement which are often present in other state's requirements;
- Of and experiences in designing, developing, conducting, and evaluating laboratory activities, using techniques, equipment and facilities which meet current technological standards for such laboratories. These studies should include computer application to science teaching, emphasizing computers as a tool for (a) computation, (b) interfacing with lab experiences and equipment, (c) processing information, (d) testing and creating models, and (e) describing processes, procedures, and algorithms;
- Of the interaction of biology with ethical and human implications in areas of development such as genetic screening, cloning, organ transplant, etc.;
- Of and experiences in using contemporary biology curricula and the innovation of instructional practices;

The program shall require professional studies distributed over the areas defined in General Standard XIV. The student teaching experience should include assessments of the candidate's ability to demonstrate competency in these areas.

Elementary Education[5]

The program shall require studies:

- In composition and the structure of language;
- Of the process of language acquisition and the application to the teaching of language arts and reading;

[4]SPP pp. 19-20
[5]SPP pp. 31-32

- Of mathematics, physical and biological sciences, environmental studies, American history, world geography, economics, the arts and literature, and human development and health;
- Of teaching and learning theory including implications for handicapped students;
- Of the measurement and evaluation of learning in the cognitive, psychomotor, and affective domains; and
- Of contemporary issues and research in elementary education.

Professional studies distributed over these areas defined in General Standard XIV. The student teaching experience should require the candidate to demonstrate competency in these areas.

4.2.2 Certification

The Department of Education reviews certification annually and the State Board conducts a major review at ten year intervals. Pennsylvania certificates are defined by combinations of Level (I or II), Category (instructional, educational specialist, supervisory or administrative), and Area (math, accounting, biology, etc.). Each has a specific set of eligibility criteria and requirements. This document will only address the instructional category.

General Eligibility Requirements for all Certificates:

1. Be of good moral character;
2. Produce a physician certificate which verifies mental and physically capabilities required for teaching;
3. Attain the age of 18;
4. Earn a baccalaureate degree (exceptions are temporary and vocation certificates); and
5. Complete an approved program of teacher education with documentation, in the form of a letter of eligibility, from said institution.

Provisional Certificate (Level I)

This certificate is valid for 6 service years. It may be converted to a Permanent Certificate after 3 years of service in area of certification. Time spent as a long-term substitute counts towards certification, but teaching under an emergency or intern certificate, or day-to-day substitution does not qualify toward permanent certification. Candidates must pass the Pennsylvania Teacher Certification Test which consists of four areas. The corresponding exams and pass scores are provided in parenthesis below:

1. Basic Skills (CBT: reading [309] and CBT: writing [311] Pennsylvania does not require the CBT math exam);(Vocational Education Instruction 1 only)
2. General Skills (Core Battery: General Knowledge [644] and Communication [646]);
3. Principles of Learning and Teaching, K-6; or Principles of Learning and Teaching, 7-12. [191]
4. Specialization Areas (discussed in a later section).

Permanent Certificate (Level II)

This certificate is valid for the life of the holder. Note that Pennsylvania is one of few states and the only one reviewed in this document to offer a life -time certificate.

Requirements:

1. Completion of an Induction Program - Every school district submits its plan for the induction experience of first year teachers to the Department of Education for approval. These plans must include a mentor relationship between the first year teacher and the instruction team. All initial teachers must participate in the school's induction program.

2. Twenty-four (24) semester hours of coursework beyond the baccalaureate at a four-year college or university with an approved program at the graduate or undergraduate level, inservice courses or a combination of both is required. Credits earned in an Intern Program are acceptable but the credits may not be Continuing Education Units (CEUs).

3. Professional Development: Six credit hours in department-approved inservice education courses, collegiate studies, or studies at degree-granting institutions every five years. Once a masters degree had been earned, the continuing education requirement is fulfilled.

Areas of Teaching Endorsements

General Requirements:

1. Graduation from an approved program and

2. Passage of the appropriate subject test.

Pennsylvania offers numerous endorsements with much overlap. To aid understanding, Table 4.1, which displays a portion of the science certification and assignment scope[6], follows. In the left hand column is the course title to which a teacher may be assigned, and in the right hand column it is indicated which endorsement is necessary to teach that course. Some of these certificates are no longer offered.

[6]CSPG #33

Table 4.1: Selected Pennsylvania Teaching Assignments and Required Certifications

Teaching Assignment	Certificate
Elementary School Science	Elementary Education
Life Science (junior high)	Science, Comprehensive Science, General Science, Biological Science or Biology
Physical Science (junior high)	Science, Comprehensive Science, Physical Science, General Science, Chemistry, Physics, or Physics and Mathematics
Earth and Space Science (junior high)	Science, Comprehensive Science, General Science, Physical Science, Earth and Space Science or Geography
General Science (junior high)	Any of the above except Geography
Biology (high school)	Science, Comprehensive Science, Biological Science or Biology
Chemistry (high school)	Science, Comprehensive Science, Physical Science, or Chemistry
Physics (high School)	Science, Comprehensive Science, Physical Science, Physics or Physics and Mathematics
Advanced Physical Science (high school)	Science, Comprehensive Science, Physical Science, Chemistry, Physics or Physics and Mathematics
Advanced Earth and Space (high school)	Science, Comprehensive Science, Physical Science, Earth and Space Science, or Geography
Advanced General Science (high school)	Science, Comprehensive Science, General Science, Physical Science, Earth and Space Science, Biological Science, Biology, Physics, Chemistry, or Physics and Mathematics

A few comments regarding the above table:

1. Junior high courses may be taught with either an elementary or secondary certificate. This is the case for all areas, in addition to the sciences. There is no separate junior high certificate. Most states distinguish between junior high and the grades above and below it, and have a special curriculum in place. Pennsylvania does not recognize this distinction.

2. Some endorsements appear redundant and unnecessary; the general science certificate only allows one to teach general science or a junior high class all of which can be taught under another certificate. All subject areas have similar overlaps — science appears to be the most prevalent.

The certificates/endorsements fall into four broad categories which enables one to teach the grades in parenthesis. Following is a list of all endorsements under the appropriate category as

well as the passing test score in parenthesis[7]. Pennsylvania has now fully adopted the PRAXIS exam as its standardized testing instrument. The PRAXIS is the successor to the NTE exam. It is important to note that not all of the passing scores have been set.[8]

Early Childhood (nursery, kindergarten, grades one-three)
Early Childhood (530)

Elementary (may teach kindergarten, grades one to six, and middle school)
Elementary (570)

Secondary (grades seven through 12)
Communication (score not set)
English (153)
Social Studies which qualifies the certificate holder to teach any course (580) (note that narrower endorsements exist in political science, history and government, history, psychology, anthropology, sociology, geography and economics)
Mathematics (540)
Biology (580)
Chemistry (500)
Earth and Space Science (570)
General Science (Can take either the Biology and General Science or the Chemistry, Physics and General Science exam. (Passing scores have not been set)
Physics (440)
Business Education - Accounting, Data Processing, Marketing, Secretarial, Office Technologies (passing scores not set)
Cooperative Education (score not set)

Specialized Areas (kindergarten to 12)
Agriculture, (score not set)
Art, (540)
Environmental Education, (score not set)
Foreign Language - French, German, Italian, Latin, Russian and Spanish (passing score not set) - Pennsylvania does not require tests of the specific language but rather a language pedagogy test.
Health (500)
Health and Physical Education (500)
Home Economics (score not set)
Industrial Arts/Technology Education (score not set)
Library Science (score not set)
Music (560)
Reading Specialist (score not set)

Passing scores may be put into perspective by comparing them with passing scores set in other states. The comparison tables may be found in Chapter 5, Section 6.3, along with a general discussion of test scores.

[7] http://www.cas.psu.edu/docs/pde/tctest.html
[8] This data comes form the most recent PRAXIS publication, the 1996-7 Spring Edition.

Master's Degree Equivalency Certificate[9]

This certificate is designed to qualify the holder for a salary increase. It is granted upon the completion of 36 graduate credit hours of which 18 must be in the content of the applicant's primary teaching assignment while a maximum of 18 may be obtained through inservice programs. Continuing Education Units are not creditable. Pennsylvania is the only state researched in this document to issue such a certificate.

Emergency Certificate[10]

This certificate is endorsed for a single subject. It is issued only at the request of an employing public school entity or equivalent and must be applied for prior to June 1. The chief school administrator of the requesting entity must certify that it has exhausted all reasonable avenues of available employment including regional advertising and college placement offices and has not located any fully qualified and properly certified applicant.

Applicants must meet the following:

1. State health requirement;
2. U.S. Citizenship requirements;
3. Bachelor's degree - except vocational education or evidence of exceptional conditions requiring Department resolution of the staffing problems;
4. Satisfactory completion of a Professional Skills Test; and
5. previous termination from their position in a public school.

Intern Certificate[11]

This certificate is valid for three calendar years. It is designed to allow qualified persons who already possess a baccalaureate degree in an area related to the certification requested, entry into the teaching profession.

Requirements are as follows:

1. The candidate must apply to and complete an approved college or university certification program's pre-admission screening and be accepted into the program.
2. Passage of the basis skills, general knowledge and subject matter area portion of the test. Upon completion of internship, the candidate must pass either the Praxis Series 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.
3. Continuous enrollment and satisfactory progress in a Teacher Intern Program leading towards a Level I Certificate.

[9] Chapter 49 §49.67
[10] CSPG #13
[11] http://www.cas.psu.edu/docs/pde/TCintern.html

Vocational Education Certificate[12]

Vocational certification is designed to attract journeyman-level persons from trades and industry and from licensed health occupations. There are three types of vocational certificates:

1. *Vocational Instructional Intern Certificate* - Valid for three calendar years

   Requirements:

   (a) Satisfactory passing of the Occupational Competency examination for the occupational area to be taught;
   (b) High school graduation or its equivalent;
   (c) Acceptance into and recommended by an approved vocational teacher certification intern program; and
   (d) During the duration of the internship the holder must complete 18 semester hours within the vocational teacher approved program.

2. *Vocational Instructional I (Provisional) Certificate* - Valid for seven service years

   Requirements:

   (a) Satisfactory completion of the Occupational Competency examination;
   (b) Two years of paid work experience;
   (c) Completion of 18 semester hours in an approved program for vocational teacher preparation;
   (d) Recommendation of the Pennsylvania preparing college; and
   (e) Satisfactory completion of the PRAXIS series computer-based test.

3. *Vocational Instructional II (Permanent) Certificate* - Valid for the life of the holder.

   Requirements:

   (a) Three years of satisfactory service on the Vocational Instructional I Certificate;
   (b) Completion of 60 semester hours at an approved program of vocational teacher preparation;
   (c) Recommendation by a Pennsylvania preparing institution;
   (d) Passage of the NTE General Knowledge and Professional Knowledge tests; and
   (e) Completion of an Induction Program.

Additional occupational areas will be added upon satisfactory passing of the appropriate Occupational Competency examination or equivalent evaluation when no exam exists.

Annulment of certificate

A certificate is annulled when any of the following occurs: Possession of certificate or letter of eligibility is obtained by fraud or mistake; Alteration of a professional certificate; Moral Turpitude; Immorality; Incompetence; Drug Abuse; or Mental Derangement.

[12]Chapter 49 §49.143-143 and §49.151-152

4.3 Arizona

The following rule language was approved on August 25, 1997 by the Arizona State Board of Education. It has not yet been approved by public hearing or by the Attorney General. The source document was accompanied by a note from Arizona State Superintendent, Lisa Graham Keegan, which emphasized the role of standard-setting for teachers to accompany new state academic standards. Standards Design Teams are currently developing subject-specific performance objectives for teachers in Arizona.

Professional Teaching Standards

The following standards provide the basis for the rules on teacher preparation programs and teacher proficiency assessment, which are later described in detail.

1. The teacher designs instruction which meets Arizona student standards and the district's assessment plan.
2. The teacher creates a climate which supports the development of students' abilities to meet Arizona standards.
3. The teacher implements instruction that develops students' abilities to meet Arizona standards.
4. The teacher assesses learning and communicates progress to students, parents, and other professionals with respect to Arizona standards.
5. The teacher collaborates with colleagues, parents, and the community to design and support learning programs that develop students' abilities to meet Arizona standards.
6. The teacher reviews and evaluates his or her own performance.
7. The teacher has general and specific academic knowledge.
8. The teacher demonstrates professional knowledge sufficient to design and plan instruction.
9. The special education teacher collaborates with other professionals in the design, implementation, and assessment of individual education programs.

Each of the above standards is accompanied by a list of suitable characteristics for performance assessment.

4.3.1 Program Approval

1. The Board is responsible for the evaluation and approval of teacher preparatory programs, which may include, but are not limited to, universities and colleges, school districts, professional organizations, private businesses, charter schools, and regional training centers.
2. The programs shall, at a minimum, abide by the professional teaching standards and offer students the opportunity to observe and practice those standards.
3. The institutions with Board approval shall provide a public statement of the type and length of approval the program has been granted.

4. Programs shall offer graduates an institutional recommendation form for issuance of the proper certification.

5. Conditional approval may be granted for two years, based on the following factors:

   (a) A written description of the unit responsible for teacher preparation including the following documentation:

      i. a listing of programs leading to certification;
      ii. a listing of programs not leading to certification;
      iii. a program summary including the number of students and graduates in each program;
      iv. a statement of mission and purpose;
      v. a listing of all full-time faculty and their qualifications;
      vi. a description of criteria for employment of part-time and full-time faculty; and
      vii. the number of full-time and part-time faculty;

   (b) Information regarding the dean or director of the program including a job description and a chart depicting the administrative and organizational structure;

   (c) Written policies and procedures for the operation of the unit;

   (d) Criteria for admission to the program including:

      i. basic skills that are assessed and the measures to used to assess them;
      ii. criteria for admission which are publicly available;
      iii. the plan for remediation of basic skill deficiencies in students; and
      iv. a summary report of assessment results for students admitted in the last three years;

   (e) The process by which the unit monitors and evaluates its operation and the effectiveness of its graduates including:

      i. policies for conducting reviews;
      ii. a summary of the findings from the last three years;
      iii. a summary of the follow-up study of graduates; and
      iv. a summary of recent program modifications made because of evaluations;

   (f) The process by which the unit evaluates the academic competencies of education students exiting the program including:

      i. a listing of assessment measures; and
      ii. a summary of reports on assessments for the prior three years;

   (g) The unit's curricula including a listing of program requirements including the number of hours, course syllabus, and objectives for each course with reference to the standards addressed and descriptions of the opportunities for observation and practice of the standards.

6. Full program approval may be granted for two years based on an assurance that the elements documented for conditional approval are substantially unchanged. The Board may conduct a site visit. The following documentation is required:

   (a) Description of changes in the unit's structure, mission statement, personnel, policy manual, or admissions criteria since last application;

(b) A summary of the evaluation reports completed in the previous two years;

(c) A summary of the evaluation reports completed by individuals outside the unit within the prior two years, including follow-up studies of graduates and employers;

(d) A summary of recent program modifications; and

(e) Description of course curriculum changes.

7. At least 75% of the unit's graduates of the prior two years must successfully complete the professional knowledge portion of the Arizona Teacher Proficiency Assessment. If at least 60%, but less than 75% of graduates successfully pass the exam, the institution may be granted an extension.

4.3.2 Teacher Certification

Duties of the Director of Certification

The Director of Certification shall issue appropriate certificates, collect proper fees for certification services, implement certification rules and regulations, and approve foreign transcript translation and evaluation agencies.

Proficiency Assessments

1. The Arizona Teacher Proficiency Assessment is the proficiency assessment for teaching certificates and is administered at least six times during the calendar year.

2. The subject knowledge, professional knowledge, and performance portions of the exam assesses the relative proficiencies in the Professional Teaching Standards for certification of special education, elementary, secondary, and vocational teachers.

3. The passing score for each assessment is determined by the Board using results of validity and reliability.

4. The provisional license allows a teacher to teach for up to four semesters before taking the exam.

   (a) If the beginning teacher has not been teaching for four semesters, the certificate shall, upon request, be employed for the number of semesters the teacher was not teaching.

   (b) If the beginning teacher has been employed for up to four semesters but has not passed the performance assessment, the certificate shall, upon request, be extended for one year.

5. If the provisionally certified teacher has not completed the performance assessment, the individual may reapply after one year if:

   (a) Efforts have been made to remediate deficiencies;

   (b) A passing score on the professional knowledge portion of the Arizona Teacher Proficiency Assessment test has been achieved in the previous year;

   (c) The requirements of the provisional certificate are met.

6. If the performance portion of the test has not been implemented by the expiration date of the provisional teaching certificate, the expiration date shall be extended for one year.

General Certification Provisions

1. Evaluation for certification begins once the Department has received an application, official transcripts, and the appropriate fees with the possible requirement of course descriptions, verification of employment, and other documents.

2. The valid date of a new certificate or certificate of renewal is the date of evaluation by the department.

3. If an applicant has not met all of the requirements for the certificate at the time of evaluation, the applicant has two years to complete those requirements and request reevaluation.

4. All degrees are awarded at an accredited institution.

5. All courses require a passing grade or credit received.

6. Teachers of home bound students must hold the same certification required of classroom teachers at the same grade level.

7. All certificates issued by the Board are considered in conformance with these rules.

8. The Board issues a comparable Arizona certificate and waives the requirements for passing the appropriate section of the Arizona Teacher Proficiency Assessment if the applicant holds a certificate from the National Board for Professional Teaching Standards.

9. Teachers in grades 7 through 12 whose primary assignment is in an academic subject pursuant to R7-2-302 must pass the relevant portion of the Arizona Teacher Proficiency Assessment. In the absence of a test in the subject area, a minimum of 24 semester hours of credit shall suffice.

Elementary Teaching Certificates

1. Provisional Elementary Certificate, grades K-8

   (a) Valid for two years, non-renewable

   (b) Requirements:

      i. Bachelor's Degree;

      ii. One of the following:

         A. Completion of a program in elementary education at an approved institution;

         B. 45 semester hours of education courses which teach the Professional Teaching Standards and eight semester hours of practicum or two years of verified teaching; or

         C. A valid elementary certificate from another state.

      iii. Passing scores on the professional knowledge portion and the elementary education subject knowledge portion of the Arizona Teacher Proficiency Assessment.

2. Standard Elementary Certificate[13], grades K-8

   (a) Valid for six years

   (b) Requirements:

      i. Qualify for the Provisional Elementary Certificate; and

      ii. Passing score on the performance portion of the Arizona Teacher Proficiency Assessment.

Secondary Teaching Certificates

1. Provisional Secondary Certificate, grades 7-12

   (a) Valid for two years, non-renewable

   (b) Requirements:

      i. Bachelor's Degree;

      ii. One of the following:

         A. Completion of a program in secondary education at an approved institution;

         B. 36 semester hours of education courses which teach the Professional Teaching Standards and eight semester hours of practicum or two years of verified teaching; or

         C. A valid secondary certificate from another state

      iii. Passing scores on the subject knowledge and professional knowledge portions of the Arizona Teacher Proficiency Assessment.

2. Standard Secondary Certificate[14], grades 7-12

   (a) Valid for six years;

   (b) Requirements:

      i. Qualify for the Provisional Secondary Certificate; and

      ii. Passing score on the performance portion of the Arizona Teacher Proficiency Assessment

[13]The current certification standards do not offer the option that the applicant complete 45 semester hours of education courses which teach the Professional Teaching Standards and eight semester hours of practicum or two years of verified teaching as listed as an option for a provisional certificate in the proposed regulations. However, the current standards do offer the option to satisfy the requirement by obtaining the following: a Bachelor's degree from a regionally accredited institution; a minor of 18 semester hours in a content area; eight semester hours in a science content area; nine semester hours of fine arts; and 45 semester hours of education coursework in a number of selected areas.

[14]The current certification standards do not offer the applicant the option of completing 36 semester hours of education courses which teach the Professional Teaching Standards and nine semester hours of practicum. Instead the current standards require the following: a Bachelor's degree from a regionally accredited institution, a major of 30 semester hours in a subject area taught in Arizona high schools, and 30 semester hours of education coursework from a specified list.

4.3.3 Alternative Certification

[Note, the Alternative Certification requirements are only listed in the current secondary certification requirements and are not a part of the proposed regulations.]

1. Valid for one year

2. Requirements:

   (a) Bachelor's degree from a regionally accredited institution;

   (b) A passing score on the Arizona Teacher Proficiency Examination (ATPE);

   (c) A major of at least 30 semester hours in the subject area to be taught; and

   (d) A passing score on a State Board approved subject area examination.

Persons enrolled in this program must be enrolled in a training program and be evaluated. The standards for this are outlined further in the certification requirements.

4.4 California

California has a Commission on Teacher Credentialing, (the Commission). The Commission has 15 members and is appointed by the Governor. It includes education administrators, faculty, teachers, and members of the public.

Their powers and duties include[15]:

1. Establish and modify credential-specific, experimental, and alternate program standards;

2. Rule on the eligibility of an applicant for accreditation when the applying institution has not previously prepared educators for a California certificate;

3. Design an evaluation of accreditation policies and their implementation;

4. Inform, advise and submit legislative recommendations regarding statutory issues related to accreditation;

5. Establish standards for the issuance and renewal of credentials, certificates, and permits;

6. Establish sanctions for the misuse of credentials and the misassignment of credential holders; and

7. Establish alternative methods for entry into the teaching profession including the development of strategies to encourage classroom aides to become credentialed teachers.

[15]California Education Code Section 44372. Can be found online at http://leginfo.public.ca.gov/cgi-bin/calawruery codesection=edc&codebody

4.4.1 Program Accreditation

California's school code[16] appears to indicate that the universities, as well as their education programs, get accredited. Students apply and are accepted to a university and then elect to enter an education program. This usually consists of taking professional development classes from the education school, as there is no formal education major offered by Californian colleges and universities.

The Commission and the Committee on Accreditation, with help from members of the education community, are assigned the duty of developing program accreditation standards. All in all, there are thousands of pages of accreditation standards, rationales, and compliance measures. This is partially because California has separate standards for the professional preparation piece of the certificates and the subject matter pieces. Furthermore, each subject matter credential has its own regulation depending on which subject the teacher will eventually teach. The regulations set the credit hours needed for each certificate, but accomplish little else. The language of the accreditation document is well intentioned but not operational, and the standards leave considerable room for interpretation.

One should also note that the accreditation visits are conducted by teams of members of the educational community appointed by the Commission. They make a recommendation to the Committee on Accreditation to approve, approve on probation, or deny accreditation. The Committee passes a recommendation to the Commission who in turn passes on their recommendation to the State Board. What follows is a sampling of the accreditation text which either highlights an important piece of the teacher preparation process or provides a sense of the document wording.

Program Quality and Effectiveness for Teacher Preparation Programs

To address the pedagogical knowledge and effectiveness of teachers, the Commission adopted Standards of Program Quality and Effectiveness for Professional Teacher Preparation Programs. These thirty-two standards define levels of quality and effectiveness that the Commission expects of teacher education programs that are offered by Schools of Education. A small sampling of these standards follows:

A: Each program of professional preparation for multiple or single subject teaching credentials shall not include more than one year of professional preparation.

B: Concerning admission:

1. The Commission shall develop models for voluntary use by California colleges and universities to assist in the screening of applications for admission to teacher education programs. The models shall give emphasis to the following qualifications of the applicants: academic talent, knowledge of subjects to be taught, basic academic skills, creativity, experience in working with children and adolescents, ability to motivate and inspire pupils, and willingness to relate education to pupils with a wide variety of cultural, ethnic, and academic backgrounds.

2. Each applicant shall take the basic skills test. That information will be used by the schools so that each applicant can receive the necessary assistance to pass the test. It is the intent of the Legislature that applicants for admission to teacher preparation programs not be denied admission on the basis of these tests.

[16] There is an excellent webpage which deals with the program approval standards. The address is http://www.ctc.ca.gov/profserv/progstan.html

3. As a group, candidates admitted into the program each year have attained the median or higher in an appropriate comparison population on indicators of academic achievement selected by the program.

   (a) The institution has defined carefully an appropriate comparison group, computed their median level of attainment on each academic achievement indicator, and attended to the attainments of each annual cohort of admitted candidates on each indicator.

   (b) Each annual cohort of admitted candidates has consistently attained the median or higher (in the comparison population) on each selected indicator of academic achievement.

   (c) The programs recruitment and admission practices reflect a commitment to achieve a representation of the population by gender, race, ethnicity and handicapping conditions.

4. Before admitting candidates into the program, the institution determines that each individual has personal qualities and pre-professional experiences that suggest a strong potential for professional success and effectiveness as a teacher.

   (a) The institution uses multiple procedures for determining each applicant's personal qualities and pre-professional qualifications, for example, personal interviews with candidates and written evaluations of candidates' pre-professional experiences with children and youth.

   (b) The program's admissions criteria consider the candidates' sensitivity to (and interest in) the needs of children and youth, with special consideration for sensitivity to children from diverse ethnic, cultural, and socio-economic backgrounds.

   (c) Prior to or during the program, each candidate engages in multicultural study and experience, including study of second language acquisition and experience with successful approaches to the education of linguistically different students.

C: The prerequisites for program admission and/or the required sequence of professional education courses includes consideration of cultural diversity, study, and discussion of the historical and cultural traditions of the major cultural groups in California society, and examination of effective ways to include cultural traditions and community values in the instructional program of a classroom.

1. Each candidate participates in a variety of culturally different schools and classrooms prior to or during enrollment in the program.

2. Each candidate examines principles of second language acquisition, and learns to use language teaching strategies and curriculum materials effectively in the education of students whose primary language is not English.

3. Each candidate has an opportunity in the program to examine and evaluate his/her own attitudes towards people of different cultural and socio-economic groups.

D: Each faculty member who teaches a course relating to teaching methods (unless their primary assignment is not education) actively participates in public elementary or secondary schools and classrooms at least once every three academic years.

E: Each candidate studies essential themes, concepts and skills related to the subject(s) to be taught, including knowledge of the history and traditions of the field, its role in the curriculum of public education, and ethical issues embedded in it.

F: Each candidate develops a professional perspective by examining contemporary schooling policies and teaching practices in relation to fundamental issues, theories and research in education.

Subject Matter Preparation Programs

Elementary Programs

Elementary programs must be at least 84 semester-units and include course work in language, literature, mathematics, science, social science, history, the arts, humanities, physical education, and human development.

Upon completion of an Elementary Subject Matter Program, candidates should know the subjects that are commonly taught in public elementary schools, as those subjects are reflected in the State's Curriculum Frameworks. The Standards for Elementary Subject Matter Programs do not include a specific number of required credits or units in any discipline. The Standards do identify certain themes and subjects that must be included in every program. The specific courses, their content, and their unit values are determined by each institution of higher education.

Elementary programs must satisfy each of the 12 standards of program quality. To receive initial program approval by the Commission, each institution must present an explanation of how each standard is met. In order to add depth to his or her knowledge of a subject, each candidate completes a concentration or a major in a discipline or an area of study. Each program offers a set of concentrations and/or majors, related to a subject area that is commonly taught in elementary or middle schools, from which candidates choose. Each concentration consists of a minimum of twelve semester units in courses that are coherently related to each other. Unless justified, the courses in a concentration are upper division courses. No course that is required of all candidates in the program may be included in any candidate's concentration.

The program course work includes knowledge, understanding, and appreciation of the perspectives and contributions of diverse ethnic, gender, and cultural groups and perspectives on individuals with disabilities.

Each subject matter program includes examination and utilization of technology that is appropriate to disciplines in the program.

The program includes a summary assessment of the subject matter competence of each candidate in language, literature, mathematics, science, social science, history, humanities, the arts, physical education, and human development. Elementary Subject Matter programs are reviewed on the same cycle as professional preparation programs, by evaluation teams of approximately five members. Team members interview program coordinators, subject matter professors, persons responsible for field experiences, persons responsible for assessment, advisors, candidates, and recent graduates of the program. Evaluators also review program documents, course syllabi, assessment instruments, advisement sheets, examples of student work, and other documents that are provided by institutions as evidence that the standards of program quality have been met.

Secondary Programs

This section will present the program approval language for English as a representative secondary discipline. In California, subject matter preparation programs for prospective teachers are not the

same as undergraduate degree programs. An applicant for a teaching credential must have earned a Bachelor's degree from an accredited institution, but the degree may be in a subject other than the one to appear on the credential. Similarly, degree programs for undergraduate students in English may or may not fulfill the Commission's standards for subject matter preparation. Completing a subject matter program that satisfies the standards enables a candidate to qualify for the Single Subject Credential in English.

Some of the stated requirements necessary for approval of the English Program are:

1. Each program of Subject Matter Preparation for the Single Subject Teaching Credential in English shall include at least 30 semester units of core course work in English and related subjects that are commonly taught in California public schools, and a minimum of 15 semester units of course work that provides breadth and perspective to supplement the essential core of the program. (Note: the requirement is identical for math and social science, if one replaces the word English with math or social science. The science requirement is a bit more rigorous, requiring at least 45 semester units in science or closely related subjects of which 24 units should be in biology, chemistry, geoscience, and physics, with a concentration of 18 units.)

2. The basic core of the program must include course work in (or directly related to) the following subjects that are commonly taught in English classes and related subjects in the public schools: literature, composition, language and linguistics.

3. The institution must include a listing and catalog description of all courses that constitute the basic core of the program. Institutions shall have flexibility to define the core in terms of specifically required course work or elective courses related to each commonly taught subject. Institutions may also determine whether the core consists of one or more distinct courses for each commonly taught subject, or courses that offer integrated coverage of these subjects.

4. Additional course work in the program must be designed to provide breadth and perspective to supplement the essential core of the program.

5. Course work offered by any appropriate department(s) of a regionally accredited institution may satisfy the preconditions and standards in this handbook.

6. The program prepares students to teach the multiple facets of English as reflected in the State English/Language Arts Framework and related curriculum documents.

7. Literature course work includes studies of major works from diverse cultures, including non-western cultures and ethnic American cultures, and other major works by American, British, and European writers, and works by excellent male and female writers. It also provides coverage of historical periods, genres, and major figures, including Shakespeare.

8. Composition course work encompasses advanced training in writing, including exposition and modes of discourse. It includes writing as a process, and various rhetorical strategies.

9. Language and linguistic course work incorporates significant study of commonly taught grammatical concepts and conventions of standard English. It includes sociolinguistics, psycholinguistics, and current linguistic theories.

10. Each student in the subject matter program acquires knowledge, understanding, and appreciation of the perspectives and contributions of diverse cultural, ethnic, and gender groups to literature, language, and writing. The program promotes educational equity by utilizing instructional, advisement, and curricular practices that offer equal access to program content and career options for all students.

11. The subject matter program has a comprehensive, ongoing system of review and development that involves faculty, students and appropriate public school personnel, including English teachers, and that leads to continuing improvements in the program.

Other Program Approval Regulations

A: The Commission may grant a waiver to accreditation provisions upon its finding that professional preparation, equivalent to that prescribed under the provision(s) to be waived, must be completed by the credential candidate(s) affected or that a waiver is necessary to accomplish any of the following:

1. Give a local education agency one semester to address unanticipated, immediate, short-term shortages of fully qualified educators by assigning a teacher who holds a basic teaching credential to teach outside of his or her credential authorization, with the teacher's consent.

2. Provide credential candidates additional time to complete a credential requirement.

3. Allow local school districts to implement an education reform or restructuring plan.

4. Temporarily exempt from a specified credential requirement small, geographically isolated regions with severely limited ability to develop personnel.

5. Provide other temporary exemptions when deemed appropriate by the commission.

B: The university may use a national accreditation body in lieu of state accreditation if the national body satisfies the accreditation framework.

C: Each institution offering a degree or diploma program designed to prepare students for a particular vocational, trade, or career field shall provide to each prospective student a school performance fact sheet disclosing all of the following information:

1. The number and percentage of students who begin the institution's program and successfully complete the entire program.

2. The passage rates of graduates in the program for the most recent calendar year.

3. The number and percentage of students who begin the program and secure employment in the field for which they were trained.

D: Individuals with bachelor's degrees who studied areas of subject matter area shortage such as math, science, and technology, or persons who are members of minority groups may be eligible for certification programs subject to alternative regulations. These programs are eligible for incentive grant funding.

4.4.2 Certification

California refers to its teaching certificates as credentials. The Commission awards the following types of credentials to applicants whose preparation and competence satisfy its standards: 1) Basic teaching credentials for teaching in K-12, inclusive, 2) Credentials for teaching adult education classes and vocational education classes, and 3) Credentials for teaching specialties, including, but not necessarily limited to, bilingual education, early childhood education, and special education. The Commission may grant credentials to any candidate who concurrently meets the commission's standards of preparation and competence for the preliminary basic teaching credential and the preliminary specialty credential.

All credentials require passage of the state's test of basic skills which covers reading, writing, and math. The Commission must compile data regarding the rate of passing the state basic skills tests by persons who have been trained in various schools.

Preliminary Credentials

A preliminary credential for either a single (secondary) or multiple (primary) subject may be granted and is valid for 5 years.

The minimum requirements for the preliminary teaching credentials are[17]:

1. Baccalaureate degree – Note: a degree in education is only acceptable if from outside California, or the candidate has two years of successful teaching experience, or the degree in education contains no less subject matter course work than would be required for a degree in a subject other than education;

2. Professional preparation consisting of a student teaching grade of at least a C;

3. One course (two semester units) in the provisions and principles of the US Constitution or a passing score on an exam on the Constitution.

4. Completion of a course in the methods of teaching reading, which must include English as second language or at least a 680 on the introduction to teaching of reading introduction exam. This is much higher than the required score in other states. For example, the required score is 500 in South Carolina, 510 in Arkansas and Indiana, 540 in North Carolina and Ohio, and 560 in Nevada and New Jersey.

Subject Matter Competence

Subject Matter Competence is obtained through completion of a subject matter program that has been approved by the Commission or passage of a subject matter examination. The Commission, with help from the subject matter advisory panel, shall select, administer, interpret, and set passing scores with the objective of assuring an adequate level of subject matter preparation. The commission must report which passing score may adversely affect a minority.

Elementary Requirements

Complete a Commission approved liberal arts subject-matter program or its equivalent.

[17]California Education Code Section 44259 and the California Commission on Teacher Credentialing homepage http://www.ctc.ca.gov

-or-

Achieve a passing score on the Praxis Series Subject Assessment entitled "Multiple Subject Assessment for Teachers" (MSAT). The MSAT exam is comprised of two test sections: (1) the Content Knowledge section which consists of 120 multiple-choice questions and (2) the Content Area Exercises section which consists of 18 constructed-response questions. The two tests measure knowledge in seven content areas: literature and language studies, mathematics, history/social sciences, science, visual and performing arts, human development, and physical education.

Secondary Requirements

Complete a Commission approved program.

-or-

Achieve a passing score on the appropriate exam. California's minimum passing scores are complicated by the fact that there are multiple tests with separate scores which will meet a given exam requirement. Also there are often multiple tests that need to be passed, in this case both separate minimum scores and a combined passing score are set. The composite score must equal the sum of the passing scores, but each test need only be passed at the minimum level.

For examples, candidates desiring a mathematics credential have two testing options:

1. Take the SSAT Mathematics Exam and obtain at least a 220, or
2. Take both parts of the Praxis II: Mathematics: Proofs, Models, and Problems Exam scoring at least a 165 on the first part and a 152 on the second part with a composite score of at least 329.

Subject Teaching Credential[18]

Multiple Subject Instruction/Standard Elementary Credential

Multiple subject instruction is practiced in California's elementary schools. The holder of a multiple subject teaching credential who has completed 20 semester hours of course work at an accredited institution in any subject taught in grades 9 and below is eligible to have that subject appear on the credential as authorization to teach the subject. The governing board of a school district may authorize the holder of a multiple subject teaching credential to teach any subject to students below grade 9, provided that the teacher has completed at least 12 semester units of course work at an accredited institution in each subject to be taught. The authorization shall be with the teacher's consent. However, the Commission, may provide that evidence of additional competence is necessary for instruction in particular subjects, including foreign languages.

Single Subject Instruction/Standard Secondary Credential

A subject teaching credential is an endorsement to teach in a particular area. Single subject instruction is practiced in California high schools and most California junior high schools. The holder of a single subject teaching credential, who has completed 20 semester hours of course work approved by the Commission at an accredited institution in any subject commonly taught in grades

[18]California Education Code Section 44256-8

7 to 12 (other than the subject for which he or she is already certified to teach) shall be eligible to have this subject appear on the credential as an authorization to teach this subject as well. The commission, by regulation, may require that evidence of additional competence is a condition for instruction in particular subjects, including foreign languages. Subject Teaching Credentials are available for: Agriculture, Health Science, Art, Home Economics, Business, Industrial and Technology Education, English, Mathematics, Foreign Language, Physical Education, Social Science, and Science[19] (can teach general science, introductory science, integrated science and coordinated science).

Designated Subject/Technical, Trade or Vocational Credential[20]

The eligibility requirements for receiving a Designated Subject Credential are as follows:

1. Five years of successful and recent experience (or experience and education) in the subject named on the credential;
2. A High school diploma or GED equivalent;
3. One course worth two semester units on the provisions and principles of the US Constitution or passage of an exam on the constitution; and
4. Sometimes the passage of an exam in subject taught is required. This is based on a decision by the ruling commission.

Professional Clear (Rectification) for Preliminary Credentials

The minimum requirements for the professional multiple or single subject teaching credential shall include completion of the following studies:

1. Study of health education (1 unit), including study of nutrition, CPR, and the physiological and sociological effects of abuse of alcohol, narcotics, and drugs and the use of tobacco. Training in CPR shall meet the standards established by the American Heart Association or the American Red Cross.
2. Study and field experience in methods of delivering appropriate educational services to students with exceptional needs in regular education programs (mainstreaming).
3. Study of computer-based technology, including the uses of technology in educational settings.
4. Completion of an approved fifth year program consisting of at least 30 semester units in a defined field of study designed to improve the teacher's competence and skills.

[19]To obtain a specific subject in science (i.e.–Biological Sciences, Chemistry, Geosciences, or Physics) the teacher's course of study must include each of the components for that area as shown below. At least one of the courses must include a laboratory component:

Biological Sciences: Molecular and Cellular Biology, Biology of Organisms, and Evolution.

Chemistry: Structure and Stability, and Chemical Reactions.

Geosciences: Astronomy, Geology, Meteorology, and Oceanography.

Physics: Energy-Mechanics, Energy-Heat, Energy-Electricity and Magnetism, Wave Motion, and Atomic and Nuclear Physics.

[20]California Education Code Section 44260

Renewal of the Designated Subject Credentials is available if the following requirements are met:

1. Two years of successful teaching has been achieved;
2. A program of personalized preparation as approved by the commission has been developed; and
3. Study of health education and computer-based technology.

The Professional Clear multiple or single subject teaching credential is valid for 5 years. The minimum requirements for maintaining the validity of the Clear multiple or single subject teaching credential are as follows:

1. Successful service as a classroom teacher. The minimum length of service shall be equivalent to one-half of a school year.
2. Completion of an individual program of professional growth of at least 150 clock hours in activities that contribute to competence, performance, or effectiveness in the profession of education. Acceptable activities shall include the completion of courses offered by regionally accredited colleges and universities; participation in professional conferences, workshops, teacher center programs, or staff development programs; service as a mentor teacher; participation in school curriculum development projects; participation in systematic programs of observation and analysis of teaching; service in a leadership role in a professional organization; and participation in educational research or innovation efforts.

Before a holder of a clear teaching credential commences or amends an individual program of professional growth, a school principal, a mentor teacher, or other district designee must certify to the credential holder that the planned program or amendment complies with this section and with regulations of the Commission.

4.4.3 Emergency Credential/Specialist Permits

This credential[21] is valid for one year or a specifically designated period of time as the Commission may determine. The granting of this credential is based on unanticipated shortages of fully qualified educators and must be accompanied by Commission approval of the justification for the emergency permit. This justification must include: 1) Documentation of a diligent search that could not find a sufficient number of certified teachers. 2) A declaration of the need for fully qualified educators made in the form of a motion to the governing board of directors or the county board of education.

Requirements for obtaining an Emergency credential are as follows:

1. Hold a Baccalaureate degree from an accredited institution;
2. Fulfill the subject matter requirement composed of 18 semester units in the subject area for single subject permit or 40 semester units in common elementary subject for multiple subject permit; **or** pass the appropriate subject matter exam (except for emergency substitute teaching permit). If the applicant has not had the opportunity to take the test , they must plan to take it when it is next offered. They will be terminated after 8 weeks if they do not pass the test.

[21] California Education Code Section 44300-1

3. The holder of an emergency permit shall attend an orientation to curriculum and instruction as well as ongoing training designed to prepare the holder for full credentials.

4.4.4 Alternative Entry Methods

Internship Credential

The Legislature and the Commission encourage colleges and universities to design and implement, concentrated internship programs for persons who have attained a bachelor's degree in the field in which they intend to teach. This credential is valid for two years and leads to full credential. California uses the Teach for America model.

Requirements are as follows:

1. Pass a subject matter exam;
2. A full summer session of college level course work;
3. A one-year internship, or the equivalent, with a seminar throughout the internship; and
4. A summer session following the internship.

Direct Application Pilot Program[22]

This is a two year preliminary credential which enables 25 applicants to bypass traditional university-based teacher preparation programs and apply directly to the Commission for a Preliminary or Professional Clear Multiple or Single Subject Teaching Credential. The cost of $1200 for assessment enables applicant to forgo a year of education school.

Minimum Requirements:

1. Successful performance in the credential area and five years experience in the subject area at the appropriate grade level; the applicant must submit copies of employment evaluations;
2. Successful completion of course work, staff development, or self study in the credential area. Accepted documentation includes grade reports, statements from staff development providers or bibliography of works read with copy of notes or journal entries;
3. Passage of the Praxis Principles of Learning and Teaching exam;
4. Successful completion of Three Praxis III Classroom Performance Assessments.

Denial

Credentials may be denied for any of the following reasons: lack of qualification, physical or mental disabilities which render one unfit, addiction to drugs or alcohol, moral turpitude, application fraud, lack of evidence of identification or good morale character, or conviction of a sex offense.

[22]California Commission on Teacher Credentialing: Certification, Assignment, and Waiver Division homepage http://www.ctc.ca.gov/dapilot/dap.html

4.5 Connecticut

4.5.1 Program Approval

The maximum approval period[23] is 5 years, but there is a shorter approval period with sufficient noncompliance to the standards. The program must adhere to "Standards and Procedures for the Approval of Connecticut Teacher Preparation Programs." Current revision of the standards, which are described further in the following section, is underway in Connecticut

Once every 5 years, or for just cause, a Visiting Team is convened on-site to review teacher preparation programs vis. a vis. Connecticut's approval standards. Teams typically consist of faculty from colleges, staff from public schools, a certification consultant, and at least one member from out of state. The team verifies the information contained in the institutional self-examination report and examines information relevant to the standards by reviewing records, interviewing staff and students, attending classes, and inspecting the physical resources of the school. At the conclusion of the visit, the team submits a written report to a committee of the State Board of Education. Board approval options include full approval for 2 to 5 years, provisional or probationary approval for a maximum of three years, or denial of program approval.

Standards adopted by the Board in 1990 established testing requirements for individuals seeking admission to teacher preparation programs. Scores from the SAT, ACT, PAA, or Praxis I Core Battery Test (CBT) are required. The candidate must also have a B-minus average and meet several other entry requirements. Effective July 1, 1993, a candidate for teacher certification must have completed a subject area major. No education majors exist except for special occupations but some schools offer education minors. Also, as of September 1996, Connecticut has had a partnership with NCATE and a joint NCATE/Connecticut team visits applicants.

Program Approval Standards

Each of the standards is followed by a more specific list of criterion with the evidence which shall be given as endorsement.

General Requirements: Clear and current statements of mission and purpose are required.

Curriculum: Teacher preparation programs must provide a program including instruction leading to the acquisition of the knowledge and skills defined in the Connecticut Teaching Competencies, study in general education, academic subject area major, professional course work, broad elective fields, and preparation to work with culturally diverse populations.

Evaluation: These standards require systematic evaluation of the program by cooperating teachers and supervising professors, and evaluation of efforts to recruit minorities. Samples of the required evaluation include student evaluation surveys and the monitoring of program effectiveness by regular review student teacher evaluations performed by cooperating teachers.

Students: There are specific requirements for admission to teacher preparation programs and student teaching requirements. Standards for students include passing of the state mandated skills exam (Praxis I CBT) or exemption from this with a waiver, at least a B-minus in undergraduate course work, as well as an interview, 2 letters of recommendation, an essay, and some general course requirements.

Faculty: Standards require planned professional development activities to keep faculty current in their fields and in effective teaching practices.

Administration: Cooperative arrangements with elementary and secondary schools and an affirmative action plan for recruiting must be established.

[23] Connecticut State Department of Education Teacher Preparation Program Approval Standards

Facilities and Resources: This section emphasizes the necessity for providing adequate administrative support, library holdings, and instructional media services and resources, including access to advanced technology and information databases.

4.5.2 Teacher Certification

Temporary Authorization for a Minor Assignment[24]

Upon written request of an employing agent of a board of education, a person may request a temporary authorization to teach a secondary subject provided:

1. They have 6 semester hours of credit in that subject;
2. They already possess a certificate for a secondary academic subject, special subject, or special education;
3. They already have a primary assignment;
4. The number of periods in which they teach the subject is no more than 2 periods.

The authorization may be granted for one year, and re-issued for one school year, provided the person completes an additional six semester hours of credit in the subject. After expiration, the person may qualify and file application for the additional endorsement area.

Durational Shortage Area Permit - Issuance[25]

A Durational Shortage Area Permit may be issued for one year in lieu of a certificate.
The employing agent of the board must perform the following:

1. Make a written request for the issuance of the permit;
2. Outline the steps that have been taken to secure a certified person;
3. Attest that special attention will be given to the person;
4. Attest that the permit holder will participate in the Beginning Educator Support and Training Program (BEST)[26]

The candidate for their permit must perform the following:

1. File an application;
2. Have fulfilled the Praxis I requirement which is described in greater detail under assessment requirements;
3. Hold a bachelor's degree;
4. Be enrolled in a program leading to certification in the field or have submitted a statement of intent;

[24]Section 10-145d-418 of the Connecticut code
[25]Section 10-145d-421
[26]The Beginning Educator Support and Training Program (BEST) specifies that the teacher will receive 2.5 years of mentoring and supervised teaching.

5. Have completed at least 12 semester hours of credit in the subject.

Durational Shortage Area Permit - Reissuance[27]

The Durational Shortage Area Permit may be re-issued no more 3 times

1. The employing agent must state that the permit-holder has served successfully.
2. The permit holder must have completed 9 additional semester hours of credit (which may be deferred during the first and second reissuance);
3. The permit holder must complete the BEST assessment (if all other requirements have been fulfilled, except for the BEST assessment, an initial educator certificate may be issued).

Assessment Requirements[28]

Praxis I: For any person who does not hold a valid certificate, one of the following must be attained (except under Sections 10-145d417 and 10-145d-427):

1. Satisfactory scores from Connecticut Competency Examination for Prospective Teachers (CONCEPT) before December 31, 1994;
2. Satisfactory scores on all components of the Praxis I after January 1, 1995;
3. A 1,000 on the Scholastic Aptitude Test (SAT) with no less than 400 on the math or verbal subtest;
4. A total score on the Prueba de Aptitude Academica (PAA) equivalent to a 1,000 on the SAT with no less than 400 on the math or verbal subtest and a minimum score of 510 on the ESLAT or TOEFL;
5. A minimum score on the English and mathematics subtest of the American College Testing Program (ACT) equivalent to a combined score of 1,000 on the SAT, with neither math nor verbal below 400 points.

Subject-area knowledge: For those who do not have a valid certificate, or those wishing to receive an additional endorsement. Persons are required to have satisfactory evaluation on Praxis II, CONNECT. *A fairly comprehensive list of subject areas is subject to the requirement.*

Professional knowledge: For a provisional educator certificate, an applicant must complete the BEST requirement, which may be waived, provided the person has completed has completed at least 30 months of successful teaching in the subject area or field for which the provisional educator certificate is sought.

Deferral of Testing Requirements[29]

A nonrenewable interim educator certificate can be issued to any person who meets the requirements for an initial educator or provisional educator certificate AND

[27]Sec. 10-145d-422
[28]Sec. 10-145d-404
[29]Sec. 10-145d-405

1. Has resided in a state other than Connecticut in the preceding year, holds a current teaching certificate there, and has completed 10 school months of successful teaching there; or

2. Has graduated from an approved teacher preparation program outside of the state.

Recommendation From an Approved Institution[30]

To be eligible for the initial educator certificate, a candidate must have completed a planned program of preparation. The official acting for the institution must indicate that the applicant has:

1. Completed the institution's approved planned program;

2. Satisfied the necessary qualities of character and personal fitness;

3. Obtained the recommendation of the institution stating that the applicant is competent to perform the duties of a teacher.

Secondary Academic Certification[31]

Secondary Academic Certification is required for anyone teaching as a secondary teacher in grades 7 through 12. The applicant must meet the assessment requirements and satisfy these criteria:

1. Bachelor's degree;

2. Minimum of 39 semester hours of credit in 5 of these 6 academic areas: English, natural sciences, mathematics, social studies, foreign language, and fine arts. Also, the applicant must have a course in US history;

   (a) Subject-area major, not in education; or

   (b) A minimum of 30 semester hours of credit in the subject, and 9 semester hours of credit for related subjects except

      i. For general science, a minimum of 39 semester hours of credit in biology, chemistry, physics, and earth science.

      ii. For history and social studies, one of the following:

         A. a history major (with 18 semester hours of credit in social studies after July 1, 1998),

         B. a major in political science, economics, geography, anthropology, or sociology (with 18 semester hours of credit in history)

         C. an interdisciplinary major of 39 semester hours in US history, western civilization or European history, and non western history, and including a minimum of one course in political science, economics, geography, sociology or anthropology, or psychology.

      iii. For the business endorsement, a major in business from an approved institution, a subject area covered by the endorsement, or an interdisciplinary major of 39 units.

      iv. For foreign languages, 24 semester hours of credit in the language, in addition to the basic 6 semester hours in that language and 9 semester hours related to it.

[30]Sec. 10-145d-408
[31]Sec. 10-145d-451

3. A minimum of 18 semester hours (30 semester hours of credit in this area for an initial educator certificate in elementary) in professional education distributed in 6 different areas.

Provisional Educator Certificate Requirements[32]

The applicant must meet the requirements for an initial educator certificate and the following requirements:

1. Completion of the BEST assessment and 10 school months of teaching under the initial educator certificate, interim educator certificate, or durational shortage permit;

2. Completion within 10 years prior to application, at least 30 school months of successful teaching in a relevant subject area; or

3. Service on a board of education under a provisional certificate in the previous year in the field.

Professional Educator Certificate Requirements for Secondary Teaching [33]

This requires 30 school months of teaching under another certificate and 30 semester hours of credit beyond a bachelor's degree which either:

1. Relates directly to the subject or grade which the applicant teaches; or

2. Is mutually agreed upon by the applicant and the employing agent of the board to increase the ability of the teacher to improve student learning.

Alternate Certification

The applicant must have a bachelor's degree and work experience in the field. The program prepares individuals for teaching in grades 4-8, secondary grades 7-12, and special subjects grades K-12. Certification is offered in the following subject areas: English, foreign language, mathematics, science, history/social studies, art (Pre-K through 12), and middle grades 4-8.

The applicant must also complete an 8 week summer program and enroll in BEST.

4.6 Ohio

4.6.1 Program Approval

A college[34] or university desiring to prepare teachers is approved based on the following:

1. Evidence of meeting or exceeding the standards of the National Council for Accreditation of Teacher Education (NCATE) as determined by: The unit accreditation board of NCATE; or the Ohio State Board of Education, which uses the standards of NCATE and Ohio applications in evaluation of institutions desiring to prepare teachers;

[32]Sec. 10-145d-451

[33]Sec. 10-145d-453

[34]The main resource is the Ohio Department of Education homepage http://www.ode.ohio.gov/ and the link to the division of Teacher Education Certification and Professional Development homepage http://www.ode.ohio.gov/www/tc/teacher.html

2. Consideration of the performance of graduates.

A college or university which seeks State Board of Education approval to prepare teachers must request approval to offer a program leading to a specific type of license. Evaluations must occur at least once every five years. Approval by the State Board of Education are based on evidence of course work and experiences designed to include the following:

1. Performance-based licensure requirements for beginning teachers (the requirements are vaguely worded but address subject matter knowledge, student learning, diversity of learners, planning instruction, instruction strategies, learning environment, communication, assessment, professional development, and student support. To give a sense of the weakness in the language what follows is exact language for the planning instruction requirement, "The teacher plans instruction based on knowledge of subject matter, of students, and of curriculum goals and models"[35].

2. Programs developed according to learned society guidelines; and

3. Pre-kindergarten through twelfth grade education State Board standards and curriculum models.

A college or university may request approval from the State Board of Education to offer experimental, innovative, or alternative programs leading to a license in an area not designated in this chapter. The program may be approved pursuant to this rule and on presentation of satisfactory need for special preparation to teach in chartered school.

The college should assess individuals as a condition for admission. This assessment should be free of cultural bias and shall include measures of oral and written communication and mathematics skills, measures of academic aptitude and achievement and determination of appropriate interpersonal relations and motivations.

There are no official references as to where the courses have to be offered but there is a significant amount of information relating to what fulfills the professional development requirement. The rest of the requirements include understanding of diversity, qualifications for faculty, services for students and facilities.

4.6.2 Certification

Ohio[36] refers to its certifications as licenses. General requirements for all licenses unless otherwise stated are:

1. Be of good moral character - A person shall be deemed to be of good moral character provided they have not been convicted of any felony, corruption of a minor, sexual imposition, theft offense, or drug abuse offense that is not a minor misdemeanor.

2. Possess a bachelor's degree.

[35]Ohio Department of Education division of Teacher Education Certification and Professional Development homepage link to licensure rules http://www.ode.ohio.gov/www/tc/rules.html section 3301-24-02

[36]Ohio Department of Education division of Teacher Education Certification and Professional Development homepage link to licensure rules http://www.ode.ohio.gov/www/tc/rules.html section 3301-24-05 and a paper copy of the Teacher Education and Certification Standards Administrative Code

3. Successful completion of an exam prescribed by the State Board of Education. Ohio's passing NTE scores, along with the other states presented in this document, are available in Table 6.4.

Provisional Teacher License

This license is valid for two years. It is the first license obtained after graduation is required for entry to an entry year program, and may be used for substitute teaching. The provisional license is issued to an individual who:

1. Holds a degree required by the license – including at least 30 semester hours of general education well distributed over the humanities, mathematics, natural science and social science;

2. Has successfully completed an approved program of preparation;

3. Has demonstrated skill in integrating educational technology in the instruction of children;

4. Has been recommended by an institution approved to prepare teachers; and

5. Has completed a minimum of six semester hours in the teaching of reading.

Teacher licenses are issued in the following areas:

Early Childhood License

Licenses are issued for ages 3 through 8 and pre-kindergarten through grade 3.

Additional requirements:

An area of concentration - 20 semester hours in one discipline in humanities, mathematics, natural science or social science.

Professional education - 30 semester hours of course work and clinical and field-based experiences designed for grades pre-kindergarten through third teaching.

Curriculum content - 30 hours well distributed over health, language arts, mathematics, music, physical education, reading, science, social studies, and visual arts. 12 semester hours in the teaching of reading.

Middle Childhood Education License

This license is valid for teaching learners from ages 8 through 14 and grades 4 through 9 in the curriculum areas named in such license.

Additional Requirements:

Curriculum content: at least 45 semester hours distributed over two of the following curriculum areas: language arts and reading, mathematics, science, and social science, with minimums of 30 hours in language arts and reading, and minimums of 20 hours in mathematics, science, or social science.

Professional education: 30 semester hours of course work and clinical and field-based experiences designed for grades 4-9 and 12 semester hours in the teaching of reading.

Adolescence to Young Adult License

This license is valid for teaching learners from ages 12 through 21 and grades 7 through 12 in the curriculum areas named in such license.

Additional Requirements:

Curriculum Content: At least an academic major or its equivalent (30 semester hours minimum) with sufficient advanced course work in all areas to be taught as specified by the teacher preparation institution and approved by the Ohio Department of Education.

Professional Education: 24 hours of course work and clinical and field-based experiences designed for grades 7-12.

Licenses issued in the following teaching fields: earth sciences, integrated language arts, integrated mathematics, integrated science, integrated social studies, life sciences, and physical sciences.

Multi-Aged License

This license is valid for teaching learners from ages 3 through 21 and pre-kindergarten through grade 12 in the curriculum areas named in the license.

Additional Requirements:

Curriculum Content: At least an academic major or its equivalent (see semester hour requirements below) with sufficient advanced course work in all areas to be taught as specified by the teacher preparation institution and approved by the Ohio Department of Education.

Professional Education: 30 semester hours of course work and clinical and field-based experiences designed for grades NK-12.

Licenses are issued in the following teaching fields: Computer Science (30 semester hours), Dance (45 semester hours), Drama/theater (45 semester hours), Foreign language (45 semester hours in one language or 30 hours each in two languages), Health (30 semester hours), Library/media (30 semester hours), Music (45 semester hours), Physical education (45 semester hours), and Visual arts (45 semester hours).

Vocational license

This license is valid for teaching the subjects named in such license to learners ages 8 and beyond and grades 4 and beyond. The vocational license may be obtained by the following two routes:

1. By an individual who holds the baccalaureate degree and who evidences two years of recent and successful related work experience or the equivalent in the teaching area.

2. By an individual who holds a minimum of a high school diploma; who evidences five years of full-time work experience or the equivalent in the teaching area, of which three years shall be within the last five years; and who completes a minimum of four semester hours of an approved pre-service vocational education program.

Vocational licenses must be issued in the following teaching fields: agriculture, health occupations, integrated business, family and consumer sciences, technology education, marketing, and trade and industry.

Entry Year Program

The entry year program must be completed prior to issuance of a professional license but requires a provisional license for entry. It includes both a formal program of support, including mentoring

to foster professional growth of the individual, and assessment of the performance of the beginning teacher.

The entry year program is one academic year in length and includes a minimum of 120 school days. Teachers may attempt to complete the entry year program requirements no more than two times under the provisional license.

The entry year program must be developed by school personnel, a majority of whom must be practicing classroom teachers, following guidelines established by the state Department of Education. School districts, chartered non public schools, or consortia of schools desiring to participate in the entry year programs engage in collaboration with colleges or universities preparing teachers. The entry year does not replace employment evaluation. Entry year assessment is exclusively used for licensure determination.

Entry Year Assessment – An assessment of skills and abilities appropriate to the field of licensure are used to assess the entry year teacher. Assessment of the skills and abilities of the entry year teacher are prescribed with the involvement of the profession, are administered under the authority of the State Board of Education, and encompass the performance-based licensure requirements (see above).

Upon successful completion of the entry year program and assessment, the individual is deemed to have met the requirements for professional licensure.

Professional Teacher License

This teacher license, which is valid for five years, is issued to an individual who:

1. Holds the appropriate provisional license and a baccalaureate degree; and

2. Has successfully completed an approved program of teacher preparation, an entry year program, and an examination prescribed by the State Board of Education.

Professional License Renewal

The professional license is valid for five years and may be renewed by individuals upon verification that the following requirements have been completed since the issuance of the license to be renewed:

Six semester hours of course work related to classroom teaching and/or the area of licensure; or 18 continuing education units (180 contact hours) or other equivalent activities related to classroom teaching and/or the area of licensure as approved by the local professional development committee (Course work or continuing education units or other equivalent activities may be combined).

Each public school district appoints a local professional development committee to oversee and review professional development plans for course work, continuing education units, or other equivalent activities. The local professional development committee are comprised of teachers, administrators, and other educational personnel, and a majority of the members of the local professional development committee shall be practicing classroom teachers.

An educator wishing to fulfill the license renewal requirements is responsible for the design of a professional needs of the educator, the students, the school, and the school district.

The second renewal of the professional teacher license requires the completion of a master's degree, or 30 semester hours of graduate credit, in classroom teaching and/or an area of licensure.

Maintenance of the professional or associate license for individuals not currently employed in a school or school district requires completion of six semester hours of course work relevant to classroom teaching and/or an area of licensure since the issuance of the license to be renewed.

The vocation license obtained without a bachelor's degree has its own renewal requirements as follows: Upon completion of an additional six semester hours of course work in the approved pre-service preparation program, the initial provisional license are renewed one time. Upon completion of the approved preparation program of 24 semester hours, an entry year program, an examination prescribed by the State Board of Education, and recommendation from an institution approved to prepare teachers, a professional license is then issued. The second renewal of the professional vocational license initially issued on the basis of a high school diploma requires the completion of an associate degree or the equivalent in the area of specialization or a baccalaureate degree in classroom teaching and/or the area of specialization.

4.6.3 Alternative Routes

Troops to Teachers

Military personnel, veterans, reserve component personnel, DoD, and DoE civilian employees who were separated not earlier than October 1, 1990 may apply for referral and placement assistance. Military personnel must have served a minimum of six years; civilian members of the DoD and DoE must have five years of federal service. Those interested in 'academic' teaching positions must have a bachelor's degree from an accredited college. Those interested in teaching vocational subjects (e.g., electronics, computers, construction trades, etc.) are not required to have a college degree to apply, but must be able to document their skill level or expertise.

High school internship certificates

These internship certificates basically allow an individual to bypass the professional education requirement.

Requirements:

1. A major or its semester hour equivalent;
2. Six semester hours of pre-service course work;
3. Passage of the appropriate exam;
4. At least three years of successful experience related to the applicants subject area and deemed essential for effective teaching. The evidence may be related to any of the following:
   (a) Teaching experience in a private school;
   (b) Work with school-age youth in a supervised setting approved or accredited by a government agency;
   (c) Instruction experience related to the desired certification area; or
   (d) Alternatives approved by the Ohio department of education.

4.6.4 Temporary Certificates

Temporary[37] elementary certificates may be issued to the holder of a currently valid standard teaching certificate provided the vacancy had been posted with the Ohio Department of Education for two weeks, and no properly certificated and suitable candidate has been identified by the employing district.

Temporary secondary certificates require the above requirements plus evidence of 20 semester hours in the subject area for which the certification is sought.

Renewal: six semester hours of course work in an approved program leading to certification in the area of temporary certification.

One-year vocational certificates

This certificate must be requested by the superintendent of a public school. Its requirements are:

1. Good moral character;
2. Four semester hours of pre-service education at a college or university approved for vocational teacher education;
3. Passage of an exam which measure technical competency; and
4. One of the following requirements:
   (a) A baccalaureate degree and evidence of 30 semester hours of technical course work;
   (b) An associate or technical degree and evidence of three years of recent related work experience; or
   (c) A high school diploma or equivalent and evidence of five years of work experience in the teaching area of which three shall be recent related work experience.

4.7 Virginia

Virginia has an Advising Board on Teacher Education and licensure (ABTEL). They are a 19 member committee appointed by the ABTEL and are responsible for proposing the following legislation. Of course, their decisions must be approved by the Virginia Board of Education.

4.7.1 Program Approval

Programs[38] are developed and approved in accordance with the established standards for the Board of Education, the Council of Higher Education, and the Southern Association of Colleges and Schools.

There is a three-day, on-site review for initial approval. Every five years thereafter another on-site mini-review is conducted. The institution must respond to weaknesses identified in the previous on-site review, changes in the programs since the last review, and any new standards developed and approved by Virginia.

[37] Teacher Education and Certification Standards Administrative Code Section 3301-23-26

[38] Chapter 540 of the Virginia Administrative Code (VAC) which can be found online at http://leg1.state.va.us/000/reg/TOC08020.HTM#C0020

Program approval requirements include the following: 1) a Mission Statement, 2) a listing of all programs for the preparation of school personnel and their relationships, 3) a program summary which includes the number of graduates by program and level, 4) official policies and procedures of the unit, such as a policy manual or constitution and by-laws, 5) a summary of reports completed within the last five years documenting internal program review, 6) a summary of reports completed in the last three years documenting external program review (e.g., follow-up study of graduates and employers), 7) a summary of recent program modifications based on evaluation results, 8) a list of basic skills that are assessed and standardized instruments used, published criteria for admission to professional education programs, 9) a report of test results or other measures for students admitted for at least the past three years, 10) a list of assessment measures used to evaluate academic and professional education graduates, 11) summary reports of competency assessment outcomes for at least three years, and 12) proposed program changes submitted, including: requests for changes in major or degree requirements; requests for waivers of the limit on professional studies; proposed changes in general or professional studies, or endorsement requirements; and requests for new programs or endorsements.

Institutions of higher education seeking state approval that prepare an institutional report that responds to standards in the following five areas: 1) knowledge bases for professional education, 2) relationship to the world of practice, 3) students, 4) faculty, and 5) governance and resources (which will not be addressed in this document). It is possible for an institution to be judged to meet a standard without addressing each criterion for compliance. In such cases, other evidence for meeting the standard would have to be offered by the institution.

Note that in this summary, the standards are in bold and the necessary criteria follow beneath.

Knowledge bases for professional education

The unit ensures that its professional education programs are based on essential knowledge, research findings, and sound professional practice. Coherence exists between: (i) courses and experiences and (ii) purposes and outcomes.

The unit makes available printed statements which effectively communicate the orientation and intent of each program and specifies the professional roles for which graduates are qualified.

The unit ensures that course work in general education, specialty studies, and professional studies complement one another.

The knowledge bases of the professional studies components are reflected in (i) curricular design and planning; (ii) course syllabi; (iii) instructional design, practice, and evaluation; (iv) students' work; (v) use of major journals in the field by faculty and students; and (vi) faculty and students participation in research and synthesis.

General education. The unit ensures that education students receive appropriate depth and breadth in an integrated course of study that is offered by faculty in the liberal arts and other general studies.

The general education component is a well-planned sequence of courses and experiences that includes theoretical and practical knowledge gained from studies in communications, mathematics, science, history, philosophy, literature, and the arts.

Education students are guided in the selection of general education courses that will provide an intellectual foundation in liberal arts and general studies and that are appropriate to the background of individual students.

Professional studies. The unit ensures that the professional studies components prepare education students to work effectively in their specific education roles.

The professional studies components includes courses and experiences which provide knowledge about professional education and relates it to the realities of practice in schools and classrooms.

The professional studies components include knowledge about (i) social, historical, and philosophical foundations of education; (ii) theories of human development and learning; (iii) research-based and experience-based principles of effective practice; (iv) impact of technology and societal changes on schools; (v) evaluation, inquiry, and research; and (vi) and educational policy.

Courses and experiences support the development of independent thinking, effective communications, the making of relevant judgments, professional collaboration, effective participation in the educational system, and professional ethics.

The professional studies components for the preparation of teachers provide knowledge and appropriate skills in learning theory, educational goals and objectives, cultural influences on learning, curriculum planning and design, instructional techniques, planning and management of instruction, design and use of evaluation and measurement methods, classroom and behavior management, classrooms and schools as social systems, school law, instructional technology, and collaborative and consultative skills.

The unit helps education students understand and apply appropriate strategies for individual learning needs, especially for culturally diverse and exceptional populations.

Required degree in arts and sciences or appropriate discipline. The unit ensures that education students meet institutional requirements for degrees in the arts and sciences.

Baccalaureate students must meet institutional requirements for degrees in the arts and sciences or disciplines appropriate to the initial endorsement being sought.

Limitation on professional studies. The unit ensures that professional studies course work, not including field experiences, is limited to 18 hours for the bachelor's degree.

Relationship to the World of Practice

The unit makes certain that clinical and field-based experiences in the professional education curriculum are designed to prepare students to work effectively in specific education roles.

Field-based and clinical experiences are accompanied by professional supervision and feedback that include attention to instructional plans, characteristics of learners and instructional settings, structured observation of the experiences, and detailed debriefing relative to program goals.

Education students participate in field-based or clinical experiences with culturally diverse and exceptional populations.

The student teaching experience is full-day for at least 10 weeks. Standards require the prospective teacher to be in classrooms full-time for a minimum of 300 clock hours. At least 150 hours shall be in direct teaching activities, providing direct instruction, at the level of endorsement.

Three-member teams of the college-based supervisor, field-based supervisor, and education student have a well-defined charge to support a successful experience as the education student assumes full-time responsibility in the school setting. Their roles and responsibilities are delineated in negotiated written agreements.

The unit maintains relationships with graduates from its professional education programs that include follow-up studies and assistance to beginning professionals.

The unit keeps abreast of emerging evaluation techniques and engages in regular and systematic evaluations, including follow-up studies, to determine the success and quality of graduates in the professional education roles for which they were prepared. The unit provides evidence of follow-up

studies and procedures used to assess the effectiveness of the teacher preparation program. These results of evaluation efforts, including NTE and follow-up studies of graduates, are used by the unit to modify and improve programs.

The professional education unit maintains positive working relationships with schools to advance the goals of the profession and to promote the effective preparation of professional educators.

The unit and local schools cooperatively develop research questions and inquiry strategies to encourage the involvement of practicing professionals with professional education faculty to further develop and refine the professional knowledge bases.

Students

The unit's admission procedures encourage the recruitment of quality candidates who represent a culturally diverse population. Incentives and affirmative procedures are used to attract candidates with potential for success.

Applicants from diverse economic and racial, and cultural backgrounds are recruited. A comprehensive system, which includes more than one measure, is used to assess the personal characteristics, communications, and basic skills proficiency of candidates preparing to teach. This system includes, but is not limited to, (i) basic skills proficiency tests; (ii) faculty recommendations; (iii) biographical information; and (iv) successful completion of college/university course work with at least a 2.5 GPA.

Policies allow for alternatives to the established admission procedure to encourage the participation of individuals from under-represented groups and other students as determined by the unit.

The unit has systematic procedures for monitoring the progress of education students from admission through completion of their professional education programs.

Systematic procedures and time lines for assessing student progress must include, but need not be limited to, the following data sources (i) GPA; (ii) observations; (iii) faculty recommendations; (iv) research or term paper; (v) recommendations from the appropriate professionals in schools.

The school ensures that the academic and professional competence of education students is assessed prior to granting recommendation for graduation or licensure.

Education students must be proficient in communication skills and their teaching or specialty fields. Students also must be able to demonstrate skills for effective professional practice.

Evaluation of students include multiple sources of data such as performance of graduates, standardized tests, course grades, and performance in classroom or school settings.

The application of a published set of criteria that specify acceptable levels of performance for exit from all professional education programs is monitored.

Faculty

The unit ensures that faculty involved in teacher preparation are qualified to perform their assignments and also reflect cultural diversity.

Faculty have earned the terminal degree or have exceptional expertise in their fields to qualify them for their assignments in professional education programs. They have formal advanced study or have demonstrated competence through independent scholarly activities in the field of specialization that they teach.

The faculty participate in activities designed to promote continuous professional development including curriculum improvement, advanced study, research, membership and involvement in pro-

fessional and learned societies, and experiences with public schools.

The unit ensure faculty opportunities in teaching, scholarship, and service.

The teaching load of undergraduate faculty is no more than the equivalent of 12 semester hours; the teaching load of graduate faculty is no more than the equivalent of nine semester hours.

Systematic and regular faculty development activities are provided.

Faculty are actively involved in professional associations, and provide education-related services at the local, state, national, or international levels in their areas of expertise and assignment.

Instructional resources for supervision of full-time clinical students do not exceed a ratio of 15 full-time equivalent students to one full-time faculty member.

The unit implements a faculty evaluation system to improve faculty teaching, scholarly and creative activities, and services.

Evaluation data is used in determining salary, promotion, and tenure.

Competence in teaching is evaluated through direct measures of teaching effectiveness such as student evaluations.

4.7.2 Certification

Virginia is in the process of revising their licensure regulations. The new regulation should become effective February 1, 1998 with implementation dates for approved programs by the fall of 2000[39] If a proceeding section of text is in *italics*, this means the requirement is only in revised regulation, whereas underlined means it is only in current regulation.

All types of licenses require the applicant to be 18 years of age, have a baccalaureate degree and recommendation from a state approved program (except Technical Professional License and alternative route), and be of good moral character. While no formal major or minor is required, the endorsement requirement essentially mandates a major for most fields.

Additional requirements for licenses are as follows:

1. Human growth and development (birth through adolescence): three semester hours

2. Curriculum and instructional procedures: six semester hours

3. Foundations of education: three semester hours

4. Reading: three semester hours *(six semester hours for primary teachers)*

5. Supervised classroom experience — The student teaching experience should provide for the prospective teacher to be in classrooms full-time for a minimum of 200 *300* clock hours with 150 hours supervised. One year of successful full-time teaching experience in the endorsement area in any accredited public or non public school may be accepted in lieu of the supervised teaching experience.

6. The general education background for all students, with the exception of those seeking the Technical Professional License shall include at least 46 semester credit hours of course work to include the following requirements (General studies course work may be applied to an endorsement unless otherwise noted): arts and humanities (art, music, philosophy, and foreign language): nine semester hours, written and oral communication skills: six semester hours, literature: three semester hours, mathematics (algebra or calculus equivalent): six semester

[39] Department of Education homepage http://www.pen.k12.va.us/gov/DOE/

hours, history (must include American History): six semester hours, social sciences: six semester hours, sciences (one course must include laboratory): six semester hours, computer sciences: one semester hour, and health and physical education: three semester hours.

7. A passing score[40] on the NTE *a professional teacher's assessment* (three tests of Core Battery and an appropriate specialty area) is required except for the Technical Professional License. If an individual has two years of teaching ability (most likely in another state) then that individual is exempt.

8. After Jan 1, 2000, complete a study in attention deficit disorder.

Types of Licenses[41]

Collegiate Professional License - A five-year, renewable license available to an individual who has satisfied all requirements for licensure, including the NTE. It is also issued to an applicant from out-of-state with a current, valid license from that state or to an individual who has completed an approved teacher preparation program in another state in a comparable endorsement area and who has met the NTE requirement.

Postgraduate Professional License - A five-year, renewable license available to an individual who has qualified for the Collegiate Professional License and who holds an appropriate earned graduate degree from an accredited institution.

Technical Professional License - A five-year, renewable license available to a person who has exhibited academic proficiency, technical competency and occupational experience. The Technical Professional License is issued at the recommendation of an employing educational agency *in the areas of vocational education, educational technology, and military science.*

Requirements for technical profession license:

1. Graduate from an accredited high school;

2. Holds a license issued by the appropriate Virginia board for those program areas requiring a license and a minimum of two years of satisfactory experience at the journeyman level or an equivalent, **or** complete a registered apprenticeship program and two years of satisfactory experience at the journeyman level or an equivalent level in the trade, **or** have four years of work experience at the management or supervisory level or equivalent, **or** have a combination of four years of training and work experience at the management or supervisory level.

3. Individuals must have completed nine semester hours of specialized professional studies credit from an accredited college or university. *The nine semester hours of professional studies course work must include human growth and development (three semester hours), curriculum and instructional procedures (three semester hours), and applications of instructional technology or foundations of education (three semester hours).*

Individuals holding the Technical Professional License who seek the Collegiate Professional or Postgraduate Professional License must meet the professional teacher's assessment requirement.

Provisional License - A three-year, nonrenewable license issued to individuals who have been employed by a Virginia educational agency.

It is available to:

[40] A listing of the passing scores for all states reviewed in this section may be found in Table 6.4.

[41] Chapter 20 section 10 of the VAC

1. An individual failing to meet an allowable portion of general, professional, or specific endorsement requirements;

2. An individual seeking the Technical Professional License or entering the teaching field though the alternate route to licensure, if recommended by employing education agency; or

3. An individual who is eligible for licensure, but who needs to successfully complete the NTE/PRAXIS *(professional teacher's assessment)* requirement.

A person not meeting the requirements for a license or provisional license may be employed and paid from public funds by a school board temporarily as a substitute teacher to meet an emergency need.

4.7.3 Alternate Route

This program[42] is targeted towards prospective teachers from non-traditional backgrounds. An individual seeking a Provisional License through the alternate route must have:

1. Earned a bachelor's degree in the arts and sciences from an accredited institution of higher education;

2. Completed 46 course work hours in the following:

   (a) Arts and humanities (9 hours);
   (b) Written and oral communication (6 hours);
   (c) Mathematics (6 hours);
   (d) Literature (3 hours);
   (e) History (6 hours);
   (f) Social sciences (6 hours);
   (g) Science (6 hours);
   (h) Computer science (1 hour); and
   (i) Health and physical education (3 hours);

3. Met endorsement requirements for subject areas;

4. Passed the PRAXIS exam; (Note if an individual does not pass, he or she can obtain a Provisional License)

5. *Fulfilled the professional studies requirements. A Virginia educational agency may submit to the Superintendent of Public Instruction for approval an alternative program to meet the professional studies requirements. The alternative program must include training (seminar, internship, course work, etc.) in human growth and development, curriculum and instructional procedures (including technology), foundations of education, and reading; and*

6. *Completed one year of successful, full-time teaching experience in the appropriate teaching area in an accredited public or non public school must be completed. (ex. student teaching)*

[42] Chapter 20 section 100 of the VAC

Within the validity period of the Provisional License, an individual shall complete:

1. Professional Studies: 15 semester hours, and
2. One year of successful, full-time experience in the appropriate teaching area.

Selected Endorsement Requirements[43]

Elementary grades 3-6 or Early Education NK-3

An applicant seeking the elementary grades 3-6 or NK-3 endorsement must complete the following:

1. Interdisciplinary study consisting of 36 semester hours in courses composed of 12 hours each in three of the following areas:
   (a) Arts and humanities: foreign language, fine arts, or philosophy/religion;
   (b) Social studies: psychology, sociology, anthropology, political science, history, economics, child development, or geography;
   (c) Sciences: life sciences or physical sciences;
   (d) Mathematics and technology;
   (e) English and language arts.
2. Field experiences: 400 clock hours, at least 300 hours of which shall be in direct teaching activities (providing direct instruction). Individuals seeking an endorsement in both the early childhood and elementary areas must complete requisite course work in each concentration area.

Elementary

Graduation from an approved teacher preparation program in elementary education PreK-6; **or** Have a degree in the liberal arts and sciences (or equivalent) and completed course work which covers the elementary education PreK-6 competencies and fulfills the following 60-semester-hour requirements:

1. English – including composition, oral communication, and literature: (12 semester hours);
2. Mathematics: (12 semester hours);
3. Science – including a laboratory course: (12 semester hours);
4. History – must include American history and world history: (nine semester hours);
5. Social Science – must include geography and economics: (six semester hours);
6. Arts and Humanities: (six semester hours); and
7. Computer/Technology: (three semester hours).

Middle education grades 6-8

[43]Chapter 20 sections 230-980

An applicant seeking the middle education 6-8 endorsement must complete the following:

Interdisciplinary study of 18 semester hours in at least two of the following concentration areas:

English and language arts. Must include course work in: language (history, structure, or grammar), literature, adolescent literature, advanced composition, and interpersonal communication or speech;

Social studies. Must include course work in: American history, world history, economics, geography, and international affairs;

Mathematics and technology. Must include course work in: algebra, geometry, probability and statistics, computer science, and applications of math;

Science. Must include a minimum of two courses in each of the following: biology, chemistry, physics, and earth and space science. A laboratory course is required in each of the four areas.

Middle education grades 6-8

Graduation from an approved teacher preparation discipline-specific program in middle education 6-8; **or**

1) Have a degree in the liberal arts and sciences, 2) completed a minimum of 21 semester hours in at least one concentration which will be listed on the license, and 3) complete the minimum requirements for those areas (English, mathematics, science, and history/social science) in which the individual is not seeking a concentration. The applicant can only teach in areas listed on the license.

English: Must include course work in language (history, structure, grammar), literature, advanced composition, and communication. Individuals seeking endorsement without an English concentration must complete 12 semester hours in English

Mathematics: Must include course work in algebra, geometry, probability and statistics, and applications of mathematics

Science: Must include courses in each of the following: biology, chemistry, physics, and earth and space science. A laboratory course is required in two of the four areas Individuals seeking endorsements in without a Mathematics or Science concentration must have completed a minimum of six semester hours in math and science for a total of 15 semester hours in math and science

History/Social Science : Must include course work in American and world history, economics, geography, international affairs, and current events. Individuals seeking endorsement without a history/social science concentration must have completed a minimum of six semester hours in history and six semester hour in social science for a total of 15 semester hours.

Math

Graduation from an approved teacher preparation program in mathematics; **or**

Completion of a major in mathematics or 36 semester hours of course work in the following areas: Algebra (including linear and abstract algebra), Geometry (including Euclidean), *Analytic geometry*, Probability and statistics, *Discrete mathematics*, Computer Science, and Calculus (including multi-variable).

Biology

Major in biology (or equivalent) that includes a minimum of 44 semester hours in the following areas:

Biology: 32 semester hours (including zoology and botany);

General chemistry: three semester hours;
Organic chemistry: three semester hours; and
Mathematics: six semester hours.

Biology

Graduation from an approved teacher preparation program in biology; **or**

A major in biology or 32 semester hours in biology, including genetics/molecular biology, botany, zoology, anatomy/physiology, ecology, and other preparation consistent with the above competencies; **or**

An endorsement in another science discipline and at least 18 credits in biology including preparation in the areas listed above.

Chemistry/(Physics)

Major in chemistry/(physics) or the equivalent to a major in chemistry/(physics) that includes a minimum of 53 semester hours of course work in the following:
Chemistry (Physics): 32 semester hours (including physical chemistry);
Biology: three semester hours;
Physics (Chemistry): six semester hours;
Mathematics: 12 semester hours.
Experiences shall include calculus and statistics.

Chemistry

Graduation from an approved teacher preparation program in chemistry; **or**

A major in chemistry or 32 semester hours in chemistry, including inorganic, organic, physical, and analytical chemistry and other preparation consistent with the above competencies; **or**

An endorsement in another science discipline and at least 18 credits in chemistry including preparation in the areas listed above.

Physics

Graduation from an approved teacher preparation program in physics; **or**

A major in physics or 32 semester hours in physics, including mechanics, electricity and magnetism, and optics and other preparation consistent with the above competencies; **or**

An endorsement in another science discipline and at least 18 credits in physics including preparation in the areas listed above.

Re-Certification[44]

The Postgraduate Professional, collegiate Professional, and Technical Professional licenses are renewed upon the completion of 180 professional development points within a five-year time period. These points can be earned through one or more of the following options: professional conferences, peer observation, education travel, curriculum development, publication of an article or book, mentorship/supervision, educational project, employing educational agency professional development activity, or college credit.

[44]Chapter 20 section 120 and 150 of the VAC

A minimum of 90 points (three semester hours) in the license holders endorsement are required for person without a master's degree. These hours can be satisfied at the graduate or under-graduate level.

Special education, gifted, educational technology and English as a second language courses can satisfy the content course requirement for one cycle of the renewal process.

One cannot duplicate a prior course in humanities and social sciences, science, math, health and physical education, and fine arts (normally offered though the college of arts and sciences)

Elementary and Middle Certifications can take courses in any of the areas listed above.

With approval of the division superintendent the 90 point requirement can be satisfied through courses towards a new endorsement or course work taken because of a particular need of a particular teacher.

The remaining 90 points may be accrued by activities drawn from one or more of the options listed above. Renewal work is designed to provide licensed personnel with opportunities for professional development relative to the grade level(s) or teaching field(s) to which they are assigned or for which they seek an added endorsement. Such professional development encompasses responsible remediation of any area of an individual's knowledge or skills that fails to meet the standards of competency, and responsible efforts to increase the individual's knowledge of new developments in his or her field and to respond to new curricular demands within the person's area of professional competence.

The proposed work toward renewal in certain options must be approved in advance by the chief executive officer or designee of the employing educational agency.[45]

Denials and Revocation

Fraudulent papers, any felony, misdemeanor involving moral turpitude, conduct or personal condition which is detrimental to the students, and misuse of funds (only for revocation) are actions which result in denial or revocation of a certificate.

4.8 Wisconsin

Power of the State

The State is allowed to:

1. Make rules establishing standards for the examination and licensing of teachers within the limits of Statute 118;

2. Prescribe procedures for the approval of teacher preparatory institutions;

3. File and register all teacher licenses;

4. Handle revocation and the certification requirements for private school teachers; and

5. Promulgate rules for the establishment of alternative teacher education programs.

[45]Chapter 540 of the Virginia Administrative Code (VAC)

4.8.1 Program Approval

1. Each[46] professional education program must be prepared to meet teacher certification requirements.

2. The state superintendent must conduct a review at the institution once every five years.

3. Applicants from out-of-state may be accepted only if they have graduated from an institution with the endorsement of that state and if they meet the teacher certification requirements.

4. An institution may accept proficiency examinations in lieu of coursework.

4.8.2 Teacher Certification

Any person seeking to teach in a public school first procures a license. No license may be granted without a bachelor's degree and the training required by the Department. Each student is required to undergo student teaching for a full semester (even if their training was conducted out of state). No license may be granted to a person who has been convicted of any Class A, B, C, or D under ch. 940 or 948, or of an equivalent crime elsewhere. A person in the alternative education program is not required to be licensed.

Adequate teaching of cooperative marketing and consumers' cooperatives to social studies certificate-holders and adequate teaching of conservation of natural resources to science/social studies certificate-holders are required; 3 years of experience or 4 years of institutional training is required for an industrial arts license. Study of minority group relations is mandatory for all teaching licenses. For all licenses, demonstrated competency in the following is necessary: conflict resolution, peer mediation, and violence between pupils. In order to teach reading or language arts, one must have training in appropriate instructional technology, such as phonetics.

The educational agency shall conduct background checks for each applicant, upon renewal or application, and on those that hold a license without expiration every 5 years. The agency must also check for certificate-holders from out-of-state. The educational agency must also be able to provide information which is confidential about persons employed at the educational agency who hold a license with no expiration, such as the person's name, SSN, and identifying information.

General Requirements for a License[47]

The applicant must complete:

1. Three semester hours in special education are required[48];

2. Preparation in human relations[49] The specified coursework emphasizes such issues as the history and contributions of women and various groups, such as the American Indian tribes of Wisconsin, and the evaluation of the impact of discrimination;

3. Coursework in the teaching of reading and language arts[50]; Specific lists of what the course work shall entail at the elementary (12 semester hours), middle school (6 semester hours), special subject areas (6 semester hours), and secondary level (6 semester hours) are provided.

[46] State of Wisconsin, Department of Public Instruction, Subchapter I, P.I. 3.02

[47] Subcapter II, P.I. 3.05

[48] Effective July 1, 1981

[49] Effective August 31, 1992. The required human relations coursework prior to this emphasized intergroup relations and the values and contributions of different groups in American society.

[50] Effective in its present form on August 31, 1992

4. 12 semester credits[51] each in the areas of mathematics, social studies, and science which emphasize content and methods of teaching[52];

5. Preparation[53] in the conservation of natural resources (with a list of what this course work encompasses)[54];

6. Coursework[55] in cooperative marketing and consumer cooperatives;

7. A student teaching experience of full days for a full semester[56 57];

8. Proficiency in mathematics, reading, writing, and in each major, minor and concentration so that they may receive passing scores on standardized tests in each of those areas[58 59];

9. Preparation in issues related to children at risk from a given list including such issues as the laws pertaining to child abuse, neglect, and delinquency, and the child welfare system[60];

10. Preparation in the history, philosophy, and social foundations of education[61];

11. Preparation in the legal, political, economic, and governmental foundations of education and the organization and policy making of schools;

12. A grade point average of 2.75/4.0 on course work in major areas, minor areas, and in professional education or standing in the upper 50% of the class[62];

13. A general education program where one-third of the semester hours constitute course work required for the institution's baccalaureate degree. Course work in the education sequence or major, minor, or concentration may not be included;

14. Course work that contributes to the career exploration of pupils[63];

15. Course work in the identification and treatment of gifted individuals; and

16. Demonstrated competency in conflict resolution[6465].

[51] If they are applying for an early childhood, elementary, or elementary/middle level license

[52] Effective August 31, 1996

[53] If they are applying to teach agriculture, early childhood, elementary, elementary/middle level, middle, middle/secondary level, and secondary level licenses in science and social science, except psychology

[54] Effective July 1, 1985

[55] If they are applying to teach agriculture and all social science subjects

[56] Effective August 31, 1990

[57] If the applicant is from outside the state, completion of a college approved student teaching experience for a full semester and 2 consecutive semesters of successful regular classroom teaching are requisite. With only an approved student teaching experience of one semester, a 2-year minor deficiencies license may be issued.

[58] Effective August 31, 1992

[59] The state superintendent shall establish passing scores and notify institutions offering programs of them at least 1 year before those scores. The state superintendent may exempt the requirement if the number of licenses in an area does no justify the development of an examination or if no examination exists.

[60] Effective August 31, 1992

[61] Effective August 31, 1992

[62] Exceptions may be granted by the state superintendent to no more than 20% of applicants for an initial license in one year

[63] Lists of specific required course work are given for applicants at the elementary, middle school, and secondary level.

[64] Effective July 1, 1996

[65] A list of the situations in which applicants shall be able to mediate conflict is included.

Types of Licenses[66]

Regular License: This is granted for 5 years to an applicant who meets all of the requirements of the chapter, and who has received institutional endorsement. Renewal may be granted upon the completion of 6 semester credits of professional education related to one of the licenses held by the applicant[67]

Life License: This is no longer issued.

Minor Deficiencies License: This is available to applicants having completed an approved program with minor course work deficiencies. It is a 2-year license, but may be renewed if the applicant is making progress toward completing the requirement.

One-Year License: This issued to an applicant who has failed to meet the continuing education requirement or the requirement necessitating 5 years of teaching for the regular license. It lasts for 1 year and may not be renewed.

Special Licenses and Permits

Special Permit: A special permit authorizes the holder for one specific assignment and lasts for 1 year.

Special License: A special license authorizes a licensed teacher to teach one specific assignment and lasts for 1 year. The district administrator or official shall issue a full explanation and justification of need, including an explanation of why fully-licensed candidates were unavailable. A request for renewal can be made if the candidate has completed 6 semester hours toward completion of an approved program and the request includes a full explanation of the need for renewal. A request for a license must be denied if the applicant does not pass the test requirements of PI 3.05(7).

Teacher Permit:

This is a 1-year permit issued to a person with a bachelor's degree but without the license requirements. It is valid for one year. The district administrator shall request a permit with a full explanation and description of the search conducted for a fully-licensed teacher. The permit may be renewed given the applicant's completion of 6 semester hours of credit in an approved program.

Mathematics and Science Permit:

This is a 2-year permit authorizing holders to teach in mathematics or science using a team approach with licensed math or science teachers. The permit lasts for 2 years and the applicant must have passed the test requirements of PI 3.05(7) and completed a 100 hour training course. The permit holder must work under the supervision of a licensed teacher with 3 years of experience where supervision means the licensed teacher is available to coordinate, direct, and inspect the practice of the permit-holder (may be waived). The license-holder is subject to the personnel evaluation required under s.121.02(1). The permit may be renewed if the applicant completes an additional 2 semester credits in continuing professional education related to the permit held (may be waived). Annually, the district administrator shall submit an explanation of how the mathematics and science programs will be enhanced by the permit-holder. At the end of the school year, the permit-holder shall submit a report describing how the programs were enhanced by the permit-holder.

[66] P.I. 3.03

[67] Equivalent clock hours are included for other professional experiences.

Early Childhood, Elementary, Middle, and Secondary Level[68]

This section articulates the specific course work and student teaching requirements for each of the licenses. All licenses, which are regular, require completion of the general requirements and graduation from an initial professional education program at an approved institution.

Early Childhood Education N-K: The applicant must complete 26 semester credits of professional education from an approved list.

Early Childhood Level Education PK-3: The applicant must complete 22 semester credits from an approved list.

To be issued a license to teach both early childhood and elementary level education, the applicant must also complete an approved minor.

To be issued a license to teach both early childhood and elementary/middle level education, the applicant must also complete an approved program under PI 3.08 and an approved minor.

Elementary Education, grades 1-8: The applicant must complete 26 semester credits from an approved list. An elementary or middle school teacher who is eligible for a license to teach grade 8 may be issued a license for grade 9 in a subject in which the applicant has a minor(under subchapter IV).

Elementary Level Education, grades 1-6: The applicant must complete 26 semester credits from an approved list. The applicant must also complete a minor approved by the state superintendent. A license under this section permits the holder to teach any subject, except a foreign language, in a self-contained class of grades 1-6: language arts, mathematics, science, social science, and health. A license to teach a specific subject under subchapter IV in grades 1-6 may be issued where the applicant has a minor.

Elementary/Middle Level Education, grades 1-9: The applicant must complete course work in development of the young adolescent, and methods of teaching for young adolescent learners. A license under this section permits the holder to teach any subject, except a foreign language, in a self-contained class of grades 1-8: language arts, mathematics, science, social science, and health. A license to teach a specific subject in grades 1-9 may be issued where the applicant has a minor(under Subchapter IV).

Middle Level Education, grades 5-9: The applicant must complete 2 minors and an approved program including course work in development of the young adolescent, methods of teaching in both of the minor subjects for young adolescent learners, and subject teaching in at least one of grades 5-9. A license may only be issued in a subject where a minor has been completed.

Middle/Secondary Level Education, grades 6-12: The applicant may be issued a license to teach a specific subject in grades 6 through 12. The applicant must have completed course work in development of the young adolescent, and methods of teaching. A regular license may be issued in the subject area in which the applicant has completed a major. A license in a subject in which the applicant completed a minor may only be issued if the applicant has also completed a major.

Secondary Education, grades 7-12: An applicant is granted the right to teach a specific subject

[68]Subchapter III

in grades 7-12. The applicant must have completed a major in a subject under Subchapter. IV, or a minor if the applicant is already licensed in a different subject area based on completion of a major. The applicant must have completed at least 18 semester credits of professional education including educational psychology, and methods of teaching.

Secondary Level Education, grades 9-12: The applicant shall have completed a major in a subject area under Subchapter IV and 18 semester credits of professional education including development of the adolescent, and methods of teaching. A regular license may be issued in the subject area in which the applicant has completed a major. A license in a subject in which the applicant completed a minor may only be issued if the applicant has also completed a minor.

Subject Area Licenses[69]

A major is required for each of these areas. A regular license to teach one of the following subjects[70] may be issued to an applicant who has completed the general requirements in s. PI 3.05 and who has completed a professional education sequence as accorded in Subchapter III at an approved program and has obtained the institutional endorsement of that program.

1. Communication Arts

   A regular license to teach one of the following subjects may be issued to an applicant who has completed the general requirements: English, journalism, speech communication, and theater.

2. Foreign Language

   A regular license to teach one of the following subjects may be issued to an applicant who has completed the general requirements: French, German, Latin, Russian, Spanish, English as a second language, and other foreign languages.

3. Mathematics and Computer Science

   A regular license to teach one of the following subjects may be issued to an applicant who has completed the general requirements: computer science and mathematics.

4. Science

   (a) Science Requirement: A regular license to teach one of the following subjects may be issued to an applicant who has completed the general requirements: biology and life science, chemistry, environmental science, earth and space science, and physics.

   (b) Physical Science: A regular license to teach chemistry, physics, and physical science may be issued to an applicant who has completed a 44 semester hour major in physical science, 22 semester hours in chemistry, and 22 semester hours in physics.

   (c) Broad Field Science: The license in broad field science permits the teaching of all sciences except biology, chemistry, earth and space sciences, and physics in grades 10 through 12 permitted that the applicant complete the following:

      i. a 54 semester credit major in science;

[69] Subchapter IV

[70] Subject area licenses are also required for such areas as health, athletics, and driver's education, but these areas are not described.

ii. 14 semester credits in each of 2 of the following (with 8 semester credits in the other 2 remaining subjects) Biology, Chemistry, Earth and Space Science, and Physics;

iii. 10 semester credits in Biology, Chemistry, Earth and Space Science, History of Science, Philosophy of Science; and

iv. 6 semester credits in mathematics.

A person holding a broad field science license may be issued a license under in any of the fields listed in #2 of the requirements where he/she has completed 15 semester credits.

A person holding a broad field science license but not meeting the credit requirement for extending licensure to teach the specific subject in grades 10 through 12 may be issued a 2-year nonrenewable license to teach biology, chemistry, physics, earth and space science. The teacher shall complete required course work to be eligible for a regular license.

(d) Science, grades 6-9: A regular license to teach science in grades 6 to 8 and general science in grade 9 who has completed all of the following:

i. An applicant must be licensed to teach any subject at the middle/secondary level, or be licensed to teach at the elementary/middle level.

ii. The applicant must have completed 10 semester credits in one of the following and 6 semester credits in the remaining 3 subjects : Biology, Chemistry, Earth and space science, and Physics.

5. Social Science

(a) A license may be issued in the following areas: anthropology, economics, geography, history, political science, psychology, sociology, and other social sciences.

(b) Broad Field Social Science: This license entitles an applicant to teach all social science in grades 6 through 9 and fusion courses[71] In addition to general requirements, an applicant shall have completed the following:

i. 54 semester credits distributed over the social science subjects in which a teacher may be licensed;

ii. A major in one of the subjects and at least 20 semester credits distributed over at least 2 of the remaining subjects; and

iii. A minor in one of the subjects and at least 32 semester credits distributed over at least 3 of the remaining subjects.

(c) Social Science, grades 6-9: This license entitles an applicant to teach all social science in grades 6-9. It may be issued to an applicant who meets the following criteria:

Has completed 30 semester credits the following :

i. 9 semester credits in history;

ii. 6 semester credits in geography; and

iii. 3 semester credits in each of the following: anthropology, economics, political science, sociology, and psychology.

Other types of licenses include: intern license, substitute teachers license, charter school instructional staff license and permit.

[71] Fusion courses are drawn from several social science disciplines, such as American problems or civics, and require composite preparation.

4.8.3 Alternative Certification

Alternative Education Program License

Any person[72] employed in an alternative education program must hold an appropriate license in the grade level and subject he or she is teaching except as follows:

1. A person holding a regular elementary education license may teach the basic skills of reading, language arts, and mathematics to secondary students for credit if the grade level of the curriculum taught does not exceed the grade level of the teacher's license;

2. A person holding a regular license may teach outside his or her area of licensing if the teaching is done in collaboration with a teacher licensed in that assignment.

An alternative education license is issued for 5 years and authorizes the holder to teach any specified subject under P I8.01 and PI 18.03 in grades 6-12 if the applicant volunteers for the assignment. A licensed teacher who has been successfully employed in an alternative education program for at least 2 semesters, 50% of the time, may be issued an alternative education program license.

An individual with 5 years experience and a bachelor's degree in engineering, math, or science who can pass the relevant portion of the National Teacher's Examination (NTE) may apply to the department for enrollment in the alternative teacher training program. The program is conducted during the summer and offers 100 hours of instruction. The department shall grant a professional teaching license to anyone who completes this program, enabling them to teach math or science in K-12 for 2 years, with the supervision of a person holding a regular teaching license.

The regular teacher supervising this person may only supervise one person and may not be removed from his/her position as a result of the employment of the permit-holder.

4.8.4 Revocation and Reinstatement

Standards for Revocation

The state superintendent may revoke any license for incompetence or immoral conduct. Incompetence means a substantial, prolonged pattern of inadequate performance of duties or the lack of ability, legal qualifications or fitness to discharge required duties, affecting the health, welfare, safety or education of pupils. There must be clear and convincing evidence of incompetence or immoral conduct.

Complaint and Investigation

The state superintendent shall at his or her own initiative or upon the receipt of a written complaint, make inquiries to determine whether an investigation is warranted. The superintendent shall acknowledge in writing any written complaint and that an investigation and revocation may result. If the superintendent deems an investigation is warranted, he/she may appoint an investigator and shall notify the licensee of the investigation and of the nature of the complaint. If the superintendent finds probable cause for revocation, the superintendent shall notify the licensee of the charges, of the licensee's's right to request a hearing within 30 days, and the superintendent's intent to revoke the license.

[72] Effective 1996

4.9 NASDTEC Comparisons

The National Association of State Directors of Teacher Education and Certification (NASDTEC) every two years compiles an extensive directory of state policies across the aforementioned areas of concern. Tables 4.2 through 4.16 provide comparative information, by state. Note that the information in these tables is self-reported by each state, and are not checked by NASDTEC for consistency or accuracy. [73]

While fourteen states require a prospective teacher to display a college major in education, eleven other states prohibit offering a major in professional education. NASDTEC reports that Michigan requires a major in education, while California, Connecticut, Maine, Massachusetts, New Jersey, New York, Tennessee, Texas, and Utah prohibit an education degree for fulfilling the requirements for an initial teaching certificate. As noted above, Pennsylvania requires that the degree be from an accredited institution, and that the particular program or specialty area be from an approved program of instruction approved by the Department of Education.(See Table 4.2).

The vast majority of states obligate prospective teachers to take general coursework in English, Humanities, Social Sciences, and Mathematics, although the range of course obligations is quite large. Pennsylvania law and regulation assumes that the institutions of higher education individually specify the appropriate amount of general coursework; there are no state requirements or guidelines.

All but a handful of states, Alaska, Arizona, Florida, Maine, Maryland, and Pennsylvania, mandate that the student teacher be visited by a supervisor. The states vary widely on the number of weeks which a student teacher must teach, and are measured in terms of clock hours, weeks of contact, or semester hours of credit. Pennsylvania requires 12 weeks of student teaching which appears to be in the high mid-range among the states. (See Table 4.5).

All states require that guidance counselors, instructors for the hearing impaired, school psychologists, reading specialists, school librarians, speech therapists, and instructors of the visually impaired be certified. In addition, many states require that school nurses be certified, as well as social workers and audiologists. The Pennsylvania Department of Education requires that guidance counselors, school nurses, and school psychologists be certified.

Twenty-seven states require some sort of test of basic skills prior to entering a teacher education program, while nineteen, including Pennsylvania, do not require any examination as a state mandated admission standard. The general pattern for states not applying admission standards is to apply competency testing in conjunction with the bachelor's degree from an accredited institution and a certification recommendation from an approved program. Core skills are typically tested in reading, writing and mathematics; Pennsylvania, which uses the National Teacher Examination and now the Praxis II test series does not require its teachers to take the basic skills mathematics test.

All states have provisions for the revocation of a teaching certificate, although there is some variation in the agency responsible for taking action. Pennsylvania maintains a Professional Standards and Practices Commission which orders the Department of Education to revoke a certificate. The states vary in whether or not revocation can be for life (it can not be in Pennsylvania), and with which institution responsibility lies for development of facts. Cause varies from "moral turpitude", one of Pennsylvania's standards[74], to specifically enumerated offenses against children.

While certification records are typically public records, the states vary as to the cost associated

[73]The extensive discussion above of selected states certification requirements is based on our analysis of primary documents in each state.

[74]Others include cruelty, negligence, incompetence and intemperance.

with providing copies of such records, the general freedom to review records (Pennsylvania's Department of Education legal office makes a case by case determination), and the extent to which local school officials have access to state records. In Pennsylvania, local school officials do not have access to state certification records, although an individual district can request such information from an applicant.

Virtually all states set program approval standards, and some also rely on regional or national accreditation (NCATE). Pennsylvania is among the top five states the number of approved teacher education institutions. As of the summer of 1997, 91 institutions in Pennsylvania had an approved program; only New York with 103 institutions had more.

Table 4.2: Non-Educational and Special Requirements for Teaching Certificates

Table 4.3: Degree and Undergraduate Education Requirements

Table 4.4: Field Experience Required before Student Teaching

Table 4.5: Student Teaching Requirements

Table 4.6: Support Services Requiring a Certificate

Table 4.7: Examinations Required or Planned

Table 4.8: Skills Included within Basic Skills Proficiency Exam

Table 4.9: Frequency of Test and Administrator

Table 4.10: Professional Development Requirements: 1

Table 4.11: Professional Development Requirements: 2

Table 4.12: Revocation and Suspensions

Table 4.13: Records Access and Issues of Privacy

Table 4.14: Standards for Program Approval

Table 4.15: Number of Approved Teacher Education Institutions

Table 4.16: List of Approved Programs by Institutions in Pennsylvania

Chapter 5

An Overview of Pennsylvania's Public Education System

5.1 Some Basic Facts

Pennsylvania's system of public education taught 1.7 million students in grades K-12 in 1995-6, spent more than $11 billion dollars, and employed better than 129,000 professional personnel.[1]

Table 5.1 displays the major features of Pennsylvania's public schools by Metropolitan Statistical Areas (MSA).[2] All but 296,000 of the 1.7 million public school students attend schools in Pennsylvania's 15 metropolitan areas. Total per-pupil spending in 1992-3 averaged $6,171, and varied considerably across the state.

Table 5.1: Pennsylvania Statistical Data by Metropolitan Statistical Area

	1990 Population	1995-6 Enrollment	Enrollment÷ Population	1992-3 Total School Exp.	$ 1992-3 Per Pupil
Allentown-Bethlehem MSA	596,054	90,526	15.20%	$521,405,896	$6,039
Altoona MSA	134,811	21,165	15.70%	$109,778,155	$5,147
Beaver MSA	183,127	28,675	15.70%	$160,743,722	$5,714
Erie MSA	281,987	43,034	15.30%	$233,778,589	$5,468
Harrisburg-Lebanon MSA	613,795	98,445	16.00%	$576,769,546	$6,064
Johnstown MSA	238,978	34,481	14.40%	$214,182,170	$6,041
Lancaster MSA	419,065	66,268	15.80%	$375,857,826	$5,988
Non-MSA Pa	1,781,105	296,196	16.60%	$1,631,080,324	$5,573
Philadelphia MSA	3,709,469	514,257	13.90%	$3,559,410,472	$7,266
Pittsburgh MSA	2,055,914	280,181	13.60%	$1,880,405,577	$6,903
Reading MSA (1)	357,727	59,965	16.80%	$348,693,741	$6,304
Scranton-Wilkes-Barre MSA	747,381	108,749	14.60%	$616,307,093	$6,008
Sharon MSA	121,093	19,569	16.20%	$101,725,839	$5,271
State College MSA	113,912	14,088	12.40%	$77,373,698	$5,880
Williamsport MSA	119,904	20,453	17.10%	$110,322,484	$5,427
York MSA	395,011	67,223	17.00%	$360,897,348	$5,764
Totals	11,869,333	1,763,275	14.86%	$10,878,732,480	$6,170

[1]Enrollment figures are from Pennsylvania Department of Education (PDE) data provided to the author in 1995. Expenditure figures refer to the school year 1992-3, the most recent year for which data are available state-wide from Pennsylvania Educational Policy Studies(1994). Employment figures are from author's tabulations of the Pennsylvania Department of Education's Professional Personnel File for 1995/6, obtained under a signed confidentiality agreement in June, 1996. These figures do not include the enrollments or expenditures of area vocational schools and do not include the enrollments or expenditures of Intermediate Units.

[2]MSA's definitions are from the 1990 Census of Population, and refer to aggregations across school districts to county geographic areas.

In the next 10 years, the total number of public school students and their age composition will undergo significant changes. State-wide public school enrollment is expected to grow from 1.76 million in 1995/6 to over 1.8 million by school year 2000. Thereafter, public school enrollment will begin to decline state-wide. As is evident from Table 5.2, the composition of Pennsylvania's public school students will become increasingly concentrated in grades 7-12 (secondary). Primary student enrollments (grades 1-6) are expected to peak in school year 1997 at 853,513, and decline to 764,015 by school year 2005. In 1995/6, secondary students constituted 44.7% of total public school enrollment. This fraction will continue to grow through school year 2005 to 49.6%.

This *relative* change in the age composition of the student population will have significant impacts on the space and curricula needs of Pennsylvania's public schools, since secondary education is generally more space-intensive and more diverse in curricula. It follows that it will be more expensive to provide as well. (See Table 5.2.)[3]

Table 5.2: Actual and Projected Public School Enrollment in Pennsylvania

School Year	K	Primary (Grades 1-6)	Secondary (Grades 7-12)	TOTAL (Grades K-12)	Secondary Share
2005	112,464	764,015	863,095	1,739,574	49.6%
2004	114,852	780,892	866,654	1,762,398	49.2%
2003	117,278	798,034	867,323	1,782,635	48.7%
2002	119,754	815,785	863,427	1,798,966	48.0%
2001	122,323	833,773	851,573	1,807,669	47.1%
2000	128,683	840,496	844,246	1,813,425	46.6%
1999	127,893	848,200	835,312	1,811,405	46.1%
1998	130,213	851,972	826,240	1,808,425	45.7%
1997	133,061	853,513	814,661	1,801,235	45.2%
1996	136,255	849,053	802,200	1,787,508	44.9%
1995	137,622	838,126	788,365	1,764,113	44.7%
1994	135,215	831,749	774,710	1,741,674	44.5%
1993	135,542	824,640	760,543	1,720,725	44.2%
1992	133,130	816,519	751,207	1,700,856	44.2%
1991	133,374	801,198	728,706	1,663,278	43.8%

5.2 Student Demographics by MSA

As might be expected, there is great diversity across Pennsylvania's regions and school districts in terms of the level and composition of student enrollment through school year 2005. If we take 1996 as the base year, only 6 out of 16 regions will experience any enrollment growth that persists through school year 2005, and none in excess of 6%.[4] Enrollment in the Williamsport and Johnstown metropolitan areas will be 11% lower by 2005 than this past academic year. While Williamsport will experience an enrollment decline, its secondary student population will rise from 46.4% of total enrollment to 49.5%; Johnstown will decline from 48.1% to 46.9%.

[3] According to Gold *et al*(1995), 36 states (including Pennsylvania) differentially weight enrollments in their state aid formulas to reflect differential costs among different categories of students.

[4] Of course this is not true at the district level.

Table 5.3: Pa. School Enrollment by MSA: 1996=1.000

MSA	Tot 1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Allentown	92,476	1.014	1.022	1.026	1.029	1.029	1.027	1.020	1.011	1.000
Altoona	21,116	0.998	0.992	0.983	0.984	0.980	0.979	0.976	0.973	0.971
Erie	43,222	1.005	1.006	1.005	1.009	1.009	1.006	1.002	0.998	0.993
Harrisburg	100,148	1.009	1.018	1.021	1.024	1.021	1.019	1.012	1.003	0.994
Johnstown	33,948	0.987	0.971	0.953	0.948	0.937	0.928	0.916	0.904	0.893
Lancaster	67,771	1.014	1.024	1.033	1.039	1.042	1.042	1.039	1.035	1.031
Scranton	110,701	1.014	1.026	1.035	1.047	1.054	1.058	1.059	1.056	1.053
Philadelphia	524,939	1.010	1.017	1.022	1.020	1.013	1.003	0.987	0.968	0.947
Pittsburgh	282,829	1.008	1.010	1.010	1.006	1.000	0.991	0.977	0.961	0.941
Reading	61,443	1.018	1.030	1.044	1.052	1.054	1.056	1.055	1.050	1.043
Sharon	19,778	1.002	0.998	0.997	0.991	0.976	0.967	0.956	0.941	0.929
State College	14,335	1.020	1.030	1.038	1.045	1.049	1.049	1.053	1.055	1.057
Williamsport	20,556	0.997	0.990	0.978	0.968	0.954	0.939	0.925	0.909	0.894
York	68,298	1.017	1.030	1.038	1.047	1.050	1.049	1.045	1.039	1.030
Beaver	29,300	1.001	1.004	1.000	0.991	0.978	0.964	0.948	0.930	0.910
Non-MSA	296,648	0.997	0.991	0.985	0.989	0.989	0.989	0.987	0.984	0.981

Source: Analysis of PDE Data

Table 5.4: Secondary Enrollment Share of Pa. Schools by MSA

MSA	1997	1998	1999	2000	2001	2002	2003	2004	2005
Allentown	44.7%	45.0%	45.4%	45.9%	46.8%	48.0%	49.2%	49.9%	50.5%
Altoona	48.1%	47.8%	47.4%	47.2%	46.7%	46.6%	46.6%	47.0%	47.4%
Erie	46.2%	46.2%	46.4%	46.1%	45.7%	45.9%	46.0%	46.2%	46.7%
Harrisburg	43.8%	43.9%	44.1%	44.5%	44.8%	45.7%	46.6%	47.2%	48.0%
Johnstown	48.1%	47.9%	47.7%	47.2%	46.9%	46.9%	46.8%	46.7%	46.9%
Lancaster	43.6%	43.9%	44.0%	44.7%	45.2%	46.2%	46.8%	47.3%	47.7%
Scranton	45.5%	46.0%	46.3%	46.9%	47.4%	48.4%	49.1%	49.5%	50.0%
Philadelphia	44.3%	45.1%	46.0%	47.0%	48.1%	49.4%	50.4%	51.2%	51.8%
Pittsburgh	46.0%	46.4%	46.9%	47.3%	48.1%	49.1%	49.9%	50.9%	51.6%
Reading	43.5%	43.8%	44.1%	44.7%	45.4%	46.7%	47.6%	48.3%	49.0%
Sharon	48.1%	48.2%	47.8%	47.8%	48.0%	48.7%	49.8%	50.3%	50.9%
State College	46.9%	47.4%	48.0%	48.2%	48.7%	49.4%	49.7%	50.1%	50.1%
Williamsport	46.4%	46.3%	46.2%	46.3%	46.4%	47.1%	47.8%	48.7%	49.5%
York	43.6%	44.3%	45.0%	45.4%	46.1%	46.6%	47.0%	47.4%	47.6%
Beaver	46.2%	46.2%	46.2%	46.7%	47.1%	48.5%	49.6%	50.8%	52.1%
Non-MSA	46.7%	47.1%	47.2%	46.7%	46.5%	46.4%	46.3%	46.0%	45.7%

Source: Analysis of PDE Data.

5.3 Professional Withdrawals from Pa. Schools: 1991-6

Pennsylvania, like a number of other states, has provided early retirement incentives to individuals in the Pennsylvania School Employees Retirement System. Pennsylvania's retirement rules require 35 years of service and a minimum age of 55 in order to retire without actuarial reduction in benefits. However, for many years, the General Assembly has provided, annually, retirement without actuarial reduction, for those age 55 with 30 years of service. During the 1993/4 school year, the state treated 27 years of service as 30 years of service, and significant numbers of administrators, teachers, and coordinators retired. Up until 1993/4, on the order of 2,000 to 3,000 professional personnel retired each year; in 1993/4, 7,847 retired. (See Table 5.5). By 1996, total professional withdrawals were at their pre-1993/4 levels of about 6,000 per year.

While 2,300 more teachers took retirement in 1993/4 than in 1992/3, administrators actually retired disproportionately more than teachers; retirements more than doubled for administrators while they only increased by 40% for classroom teachers. (See Table 5.6).

Table 5.5: Reasons for Withdrawal in Pa.: 1991-96

Reason for Withdrawal	1991	1992	1993	1994	1995	1996
Resigned Left Education	1,416	2,026	1,575	1,212	1,479	1,436
Resigned In Education	463	502	492	511	541	616
Furloughed	665	702	132	111	115	124
Disciplinary Action	21	32	22	30	38	29
Certification Revoked	10	16	6	8	29	38
Retired	2,598	2,794	7,847	1,124	1,914	3,630
Death/Illness	141	172	166	155	159	162
Other	781	813	587	710	666	582
Total	6,095	7,057	10,827	3,861	4,941	6,617

Source: Tabulations of Professional Personnel Files

Table 5.6: Type of Withdrawals in Pa.: 1991-96

Type of Position	1991	1992	1993	1994	1995	1996
Administrator	469	522	1,199	292	369	531
Teacher	4,649	5,544	7,841	2,983	3,869	5,041
Coordinator	977	991	1,787	586	703	1,045
Total	6,095	7,057	10,827	3,861	4,941	6,617

Source: Tabulations of Professional Personnel Files

5.4 Teacher Demographics

As of school year 1996/7, the median age of Pennsylvania's classroom teachers varied from 43 years old in Lancaster MSA to 47 years old in the Pittsburgh and Beaver MSAs. Fully 25% of Pennsylvania's teachers are 49 or 50 and have 25 years of total teaching experience (see Table 5.7).[5]

Thus, in five years 25% will be eligible for full retirement benefits, and, were they to depart all at one time, a significant number of districts would be seeking to replace 1/4 of their classroom teachers.

If we examine the age and experience by type of classroom assignment or administrative assignment, we see the same general pattern (see Table 5.8), although about a quarter of elementary and secondary principals are eligible already, based on total years of service, to retire without actuarial reduction. Again, there are regional differences in the age-experience profiles of teachers and administrators, but not sufficiently great to alter the general conclusion that in the next few years, many education professionals may choose to retire.

[5]I follow PDE practice and measure teaching experience by the number of years of contribution to the teacher retirement system. In the case of long-term substitutes, however, this understates their classroom experience as they do not qualify for contributions to the state retirement system.

Table 5.7: Age and Professional Experience of Pa. Classroom Teachers by MSA in 1996/7

MSA	Number FT Teachers	Age 25%	Age Median	Age 75%	All Exp 25%	All Exp Median	All Exp 75%	SD Exp 25%	SD Exp Median	SD Exp 75%
Allentown	5,111	36	45	49	9	19	26	6	15	25
Altoona	1,149	37	45	49	10	20	26	7	16	25
Erie	2,356	37	45	50	10	18	25	7	14	24
Harrisburg	6,136	35	45	50	8	17	25	6	13	24
Johnstown	2,088	39	45	50	10	21	26	7	18	25
Lancaster	3,659	33	43	49	7	15	24	6	11	23
Scranton	6,308	39	45	50	10	21	26	7	19	25
Philadelphia	29,415	38	46	51	7	17	25	5	14	24
Pittsburgh	16,537	41	47	51	10	22	28	7	21	27
Reading	3,434	35	44	49	7	17	25	5	12	24
Sharon	1,113	37	45	50	8	19	26	6	16	25
State College	849	37	45	50	9	18	25	6	13	23
Williamsport	1,154	37	45	50	9	19	26	6	14	25
York	3,786	33	43	49	7	17	25	5	12	24
Beaver	1,639	39	47	51	9	22	28	6	19	27
Non-MSA	17,338	38	45	50	10	20	26	7	18	25
All	102,072	38	45	55	8	19	26	6	16	25

Table 5.8: Age and Professional Experience of Pa. Professional Personnel: 1996/7

Classification	FT Personnel	Age 25%	Age Median	Age 75%	Tot Exp 25%	Tot Exp Median	Tot Exp 75%	SD Exp 25%	SD Exp Median	SD Exp 75%
Adm:Executive Director (IU)	27	52	56	61	28	32	37	14	21	26
Adm:Assist Exec Director (IU)	17	48	50	54	25	26	32	10	21	24
Adm:District Superin	497	48	52	55	26	29	32	5	10	23
Adm:Assistant Superin	216	47	50	54	23	27	31	5	12	26
Adm:Elem Princ	1,675	45	49	53	21	25	30	8	21	27
Adm:Assistant Elem Princ	110	43	47	51	17	24	27	4	14	25
Adm:Secondary Princ	959	46	49	53	21	26	30	6	18	27
Adm:Assistant Secondary Princ	701	43	47	51	17	23	28	4	12	25
Adm:Princ, K through 12 or Mi	295	45	48	51	21	25	29	7	18	25
Adm:Assistant Princ, K-12 or	208	40	46	50	14	20	26	4	8	21.5
Adm:Director of Vocational Ed	77	47	50	54	21	25	28	4	10	19
Adm:Assistant Dir of Vocation	31	46	52	56	19	25	30	10	17	27
Adm:Coordinator	98	47	50	55	23	28	32	13	26.5	30
Adm:Supervisor	1,366	46	50	54	21	25	29	8	21	27
Tch:Elementary	44,379	38	45	50	8	19	26	7	17	25
Tch:Secondary	40,439	39	47	51	9	21	27	7	19	26
Tch:Special, K-12 or MS	5,866	37	45	49	9	19	26	7	18	25
Tch:Special Ed	12,802	35	42	47	7	14	21	4	9	18
Tch:Speech Correct	1,586	38	43	47	10	17	23	5	10	20
Coord/Adm:Asst Superin for In	39	47	49	52	23	27	30	5	20	28
Coord/Adm:Asst to Superin for	15	42	53	58	17	31	32	5	19	30
Coord/Adm:Business Manager	407	39	45	51	7	14	21	4	9	15
Coord/Adm:Dental Hygienist	24	41.5	46	51.5	12.5	17.5	26	10	17.5	25
Coord/Adm:Director of Data Pr	43	37	43	49	7	12	21	4	10	18
Coord/Adm:Director of Personn	64	45	50	54	15.5	26	30.5	4	11.5	26
Coord/Adm:Coordinator, Fed Pg	59	46	49	55	13	24	30	6	17	24
Coord/Adm:Guidance, Elem	1,281	42	47	51	8	19	25	5	11	23
Coord/Adm:Guidance, Secondary	2,379	42	48	53	11	23	29	7	19	26
Coord/Adm:Home or Sch Visitor	203	43	50	54	7	18	27	6	16	25
Coord/Adm:Librarian, Elem	826	43	47	51	12	20	25	8	17	24
Coord/Adm:Librarian, K-12 or	1,352	44	48	52	12	21	27	9	18	25
Coord/Adm:Manager, Sch Food S	23	39	42	53	8	12	20	4	9	16
Coord/Adm:Occupational Therap	46	31	36	42	2	4	10	2	4	8
Coord/Adm:Physical Therapist	28	39.5	47	54.5	4	16.5	23.5	4	8	17
Coord/Adm:Psychiatric Social	59	37	42	49	5	8	19	3	6	15
Coord/Adm:Psychological Exami	8	40.5	44	47	5.5	9	16	3.5	5	10.5
Coord/Adm:Psychologist	791	40	47	51	9	17	24	5	10	19
Coord/Adm:Sch Nurse	1,806	42	49	56	6	11	19	5	10	17
Coord/Adm:Specialist	4,683	43	47	51	13	20	25	9	18	23
Coord/Adm:Other Not Listed Ab	1,951	38	46	51	4	14	24	3	10	21
Total	127,436	39	46	50	9	19	26	6	16	25

Source: Tabultures of 1996/7 Professional Personnel file.

Table 5.9: Certification, Age and Professional Experience of Pa. Classroom Teachers: 1996/7

Certification	Teachers 96/7	Age 25%	Age Median	Age 75%	Tot Exp 25%	Tot Exp Median	Tot Exp 75%	SD Exp 25%	SD Exp Median	SD Exp 75%
Adm/Supervisory	1,224	46.0	50.0	54.0	21.0	25.0	29.0	8.0	21.0	27.0
Agriculture	181	34.0	41.0	49.0	7.0	16.0	24.0	4.0	13.0	21.0
Art	2,848	40.0	46.0	50.0	10.0	20.0	26.0	8.0	18.0	25.0
Biology	1,871	35.0	46.0	51.0	7.0	20.0	28.0	5.0	18.0	27.0
Business Education	1,989	41.0	48.0	52.0	12.0	22.0	27.0	9.0	20.0	26.0
Chemistry	977	34.0	46.0	52.0	7.0	18.0	28.0	5.0	15.0	26.0
Coordinate Service	142	46.0	50.0	55.0	21.0	26.0	30.0	7.0	20.5	25.0
Driver Education	232	44.0	49.0	52.0	20.0	26.0	30.0	18.0	25.0	29.0
Early Childhood	1,416	33.0	42.0	47.0	6.0	11.0	21.0	5.0	10.0	20.0
Earth/Space	619	38.0	46.0	50.0	9.0	22.0	28.0	8.0	21.0	27.0
English	6,747	41.0	47.0	51.0	10.0	22.0	27.0	8.0	19.0	26.0
French	786	43.0	48.0	51.0	11.0	21.0	27.0	8.0	17.0	26.0
General Elementary	39,890	38.0	46.0	50.0	8.0	19.0	26.0	7.0	17.0	25.0
General Science	2,047	37.0	47.0	51.0	8.0	21.0	28.0	7.0	19.0	27.0
German	402	41.0	46.0	51.0	10.0	20.0	26.0	7.0	17.0	26.0
Gifted	751	44.0	47.0	51.0	13.0	21.0	26.0	6.0	16.0	25.0
Health/Phys Educ	5,639	39.0	45.0	50.0	11.0	22.0	27.0	9.0	21.0	26.0
Hearing Impaired	335	38.0	43.0	48.0	9.0	17.0	22.0	5.0	15.0	21.0
Home Economics	1,706	42.0	46.0	51.0	13.0	19.0	24.0	8.0	17.0	23.0
Industrial Arts	1,965	38.0	46.0	51.0	12.0	22.0	28.0	10.0	20.0	26.0
Mathematics	6,237	36.0	47.0	51.0	9.0	21.0	28.0	7.0	19.0	27.0
Mental/Phys Hand.	12,140	35.0	42.0	47.0	7.0	14.0	21.0	4.0	9.0	17.0
Music	3,912	35.0	43.0	49.0	9.0	17.0	25.0	7.0	14.0	24.0
Not Listed Elsewhere	128	33.0	42.0	48.0	4.0	10.0	19.0	3.0	7.0	17.0
Other Languages	178	44.0	49.0	53.0	10.0	20.0	25.0	6.0	14.5	23.0
Other Science	28	32.5	45.5	49.5	5.0	15.5	28.0	4.0	12.0	27.5
Physics	549	32.0	45.0	51.0	6.0	17.0	27.0	4.0	13.0	26.0
Social Studies	5,844	40.0	48.0	52.0	9.0	23.0	29.0	7.0	22.0	28.0
Spanish	1,562	36.0	45.0	50.0	6.0	16.0	25.0	4.0	12.0	23.0
Speech/Lang Impaired	1,586	38.0	43.0	47.0	10.0	17.0	23.0	5.0	10.0	20.0
Visually Impaired	190	39.0	44.0	48.0	10.0	17.0	22.0	6.0	12.0	19.0
Vocational Educat	1,686	40.0	46.0	53.0	7.0	15.0	23.0	6.0	13.0	21.0
Vocational Health	128	40.0	45.5	56.0	5.0	11.0	18.0	4.0	10.0	17.0
Vocational Tech Ed	347	35.0	45.0	50.0	5.0	15.0	25.0	4.0	11.0	23.0
Total	106,282									

Source: Tabulations of Professional Personnel File.

With regard to ethnicity of Pennsylvania's classroom teachers, they are predominantly white. In the 1980's Black classroom teachers constituted about 6.5% of the statewide total, and in the 1990's the percentage had fallen to about 5.5%. The vast majority of Black classroom teachers are employed in Philadelphia and Pittsburgh; both districts were under federal court order in the 1980's to increase the representation of Black classroom teachers.

Table 5.10: Ethnicity of Pennsylvania Classroom Teachers: 1983-96

Year	American Indian or Alaskan	Black Not Hispanic	Asian or Pacific Islander	White Not Hispanic	Hispanic	Total
1983	46	5912	121	85453	261	91,793
	0.05%	6.44%	0.13%	93.09%	0.28%	
1984	32	5750	88	83057	217	89,144
	0.04%	6.45%	0.10%	93.17%	0.24%	
1985	28	5879	94	85176	233	91,410
	0.03%	6.43%	0.10%	93.18%	0.25%	
1986	23	5985	93	85559	237	91,897
	0.03%	6.51%	0.10%	93.10%	0.26%	
1987	29	6317	93	87322	258	94,019
	0.03%	6.72%	0.10%	92.88%	0.27%	
1988	22	6206	128	88233	249	94,838
	0.02%	6.54%	0.13%	93.04%	0.26%	
1989	25	6364	91	89763	271	96,514
	0.03%	6.59%	0.09%	93.01%	0.28%	
1990	28	6446	99	91264	293	98,130
	0.03%	6.57%	0.10%	93.00%	0.30%	
1991	24	5793	139	87374	319	93,649
	0.03%	6.19%	0.15%	93.30%	0.34%	
1992	30	6096	207	92555	357	99,245
	0.03%	6.14%	0.21%	93.26%	0.36%	
1993	32	5604	207	90277	384	96,504
	0.03%	5.81%	0.21%	93.55%	0.40%	
1994	36	5592	211	92096	388	98,323
	0.04%	5.69%	0.21%	93.67%	0.39%	
1995	33	5704	222	94133	412	100,504
	0.03%	5.68%	0.22%	93.66%	0.41%	
1996	33	5687	231	95985	423	102,359
	0.03%	5.56%	0.23%	93.77%	0.41%	

5.5 Numbers and Experience of New Teaching Hires

As there have been about 100,000 classroom teachers in Pennsylvania for many years, a question arises about whether or not finding 25,000 in a year or two is consistent with hiring experience, state-wide, over the past decade. Table 5.11 indicates that between 4,000 and 6,000 teachers, administrators and coordinators have been annually hired by all of Pennsylvania's local districts and intermediate units; 1993 witnessed almost 8,000 new hires.

Hires of inexperienced classroom teachers have been no more than 2,000 per year, and in the last two years, that number has dropped to no more than 1,200. (See Table 5.12).

Table 5.11: New Hires of Professional Personnel in Pa.: 1984-96 by Type of Position

Year	Admins.	Teachers	Coordinators	Total
1984	248	4,127	464	4,839
1985	151	3,795	470	4,416
1986	214	4,479	486	5,179
1987	271	5,034	529	5,834
1988	230	4,041	458	4,729
1989	276	5,247	642	6,165
1990	304	5,547	664	6,515
1991	251	3,696	680	4,627
1992	257	4,218	564	5,039
1993	490	6,312	1,117	7,919
1994	235	3,450	607	4,292
1995	253	3,821	736	4,810
1996	287	4,041	751	5,079
Total	3,467	57,808	8,168	69,443

Source: Tabulations of Professional Personnel File.

Table 5.12: New Hires of Pennsylvania Classroom Teachers: 1984-96 by Experience Level

Year	Inexperienced	Experienced	Total
1984	1,889	2,207	4,096
	46.12%	53.88%	
1985	1961%	1,834	3,795
	51.67%	48.33%	
1986	1,957	2,522	4,479
	43.69%	56.31%	
1987	2,209	2,825	5,034
	43.88%	56.12%	
1988	1,926	2,115	4,041
	47.66%	52.34%	
1989	1,967	3,280	5,247
	37.49%	62.51%	
1990	1,918	3,629	5,547
	34.58%	65.42%	
1991	1,639	2,057	3,696
	44.35%	55.65%	
1992	1,970	2,248	4,218
	46.70%	53.30%	
1993	1,995	4,317	6,312
	31.61%	68.39%	
1994	928	2,522	3,450
	26.90%	73.10%	
1995	1,110	2,711	3,821
	29.05%	70.95%	
1996	1,285	2,756	4,041
	31.80%	68.20%	

Source: Tabulations of Professional Personnel Files.

5.6 Supply of Teaching Certificates From Pennsylvania Colleges and Universities

While about 1,000 to 2,000 newly trained teachers have been annually hired in Pennsylvania, far more teaching certificates have been issued. Pennsylvania currently has more than 90 teacher preparation institutions including 14 state supported institutions which were originally two year normal schools. Table 5.13 displays the annual number of teaching certificates issued based on the year of most recent certificate obtained by a certified teacher.

In the past several years, Pennsylvania certificating institutions have issued more than 20,000 certificates of various kinds per year. (See Tables 5.13-5.15). Compared to the 1980s, the production of various teaching and administrative certificates is accelerating. It follows, of course, that the vast bulk of newly trained teachers each year are unable to obtain teaching positions. Table 5.14 displays the astounding production of teaching certificates by institution over five year intervals.[6]

[6]Note that the Total column includes certificates issued before 1966. Also, departmental records before the

Table 5.13: Total Certificates Issued by Pennsylvania Institutions

Year	Certificates
1964	2,645
1965	2,856
1966	3,501
1967	6,155
1968	12,517
1969	16,019
1970	17,317
1971	18,987
1972	20,371
1973	21,839
1974	22,471
1975	22,919
1976	21,573
1977	20,019
1978	18,428
1979	15,358
1980	14,084
1981	12,991
1982	12,126
1983	11,458
1984	10,917
1985	10,840
1986	11,163
1987	11,785
1988	10,589
1989	11,402
1990	13,654
1991	16,184
1992	17,558
1993	20,009
1994	20,090
1995	20,463
1996	23,945
1997 (partial)	13,464

Source: Tabulations of Professional Certification File.

mid-1960s were not computerized.

Table 5.14: Education Certificates Issued by Pa. Teacher Preparation Institutions

Institution	66-70	71-5	76-80	81-85	86-90	91-95	96-97	Total 51-97
Albright College	156	261	248	75	87	133	49	1033
Allegheny College	141	154	128	45	59	80	52	717
Allentown College/St Fran	0	5	42	26	4	68	47	228
Alliance College	13	35	14	3	0	0	0	70
Alvernia College	52	98	136	60	82	248	107	799
Antioch Univ.	0	51	438	308	333	158	17	1306
Beaver College	277	268	481	497	564	956	371	3458
Bloomsburg U of Pa	1,386	2,052	3,157	1,541	1,583	2,539	1,038	13617
Bryn Mawr College	16	37	101	74	70	74	28	404
Bucknell U	311	422	562	279	269	439	181	2545
Carnegie-Mellon	302	303	232	28	20	58	23	1049
Cabrini College	135	236	327	299	304	714	341	2365
Cal U of Pa	2,017	3,786	3,920	1,628	1,565	2,557	985	16771
Carlow College	414	530	428	184	273	566	296	2878
Cedar Crest College	269	308	255	123	122	176	105	1378
Chatham College	103	178	147	57	96	232	89	934
Chestnut Hill College	660	679	551	277	287	468	186	3140
Cheyney U of Pa	494	716	1,052	448	327	577	201	4056
Clarion U of Pa	1,373	2,317	2,667	1,224	1,152	1,938	682	11621
College Misericordia	517	547	582	206	151	246	109	2612
Combs College of Music	3	2	1	13	16	8	0	44
Delaware Valley College	12	11	2	0	0	11	21	57
Dickinson College	130	151	157	109	92	114	32	813
Drexel U	200	317	360	90	80	242	155	1482
Duquesne U	1,151	2,153	2,576	996	1,066	1,798	705	10923
E Stroudsburgh U of Pa	923	1,455	2,570	1,183	903	1,791	813	9827
Eastern College	81	144	176	93	138	453	275	1364
Edinboro U of Pa	1,359	3,113	3,816	1,562	1,534	2,600	983	15189
Elizabethtown College	351	518	442	182	161	361	161	2245
Franklin and Marshall	98	157	187	43	3	4	0	502
Gannon U	137	219	252	104	144	308	122	1316
Geneva College	343	627	576	279	230	374	133	2626
Gettysburg College	325	326	437	213	151	157	68	1726
Grove City	400	443	578	332	381	528	247	3001
Gwynedd-Mercy College	117	345	325	220	261	474	209	1951
Haverford College	9	2	1	0	0	0	0	15
Holy Family College	97	225	297	117	154	618	367	1879
Immaculata College	359	828	802	440	266	465	273	3553
Indiana U of Pa	2,818	4,204	5,108	2,248	2,186	3,764	1,470	22401
Juniata College	190	224	188	77	94	254	98	1197
Kings College	123	193	221	67	75	208	109	1011
Kutztown U of Pa	1,185	2,309	3,165	1,401	1,556	2,998	1,080	13930
LaSalle U	218	291	538	244	261	505	198	2325
Lafayette College	40	115	146	40	45	7	2	411
Lancaster Bible College	0	0	0	0	0	25	18	43
Laroche College	0	3	1	0	0	3	13	20
Lebanon Valley College	220	300	444	211	157	285	165	1858
Lehigh U	151	506	1,049	426	430	580	201	3364
Lincoln U	29	35	62	46	32	69	28	321
Lock Haven U	812	1,304	1,626	923	779	1,273	454	7417
Lycoming College	284	345	264	83	130	350	126	1616
Mansfield U of Pa	1,081	1,871	2,010	755	743	935	384	7951
Marywood College	932	1,197	1,397	630	479	851	368	6336
Mercyhurst College	279	352	440	250	232	366	149	2161
Messiah College	53	152	363	275	321	531	200	1896
Millersville U of Pa	1,525	2,744	4,142	2,009	2,132	3,588	1,258	17696
Moore College of Art	80	95	104	22	27	90	26	465
Moravian College	209	261	298	146	131	314	140	1530
Muhlenberg College	172	209	226	77	67	157	62	999
Neumann College	0	0	4	34	49	139	53	279
Pa College of Optometry	0	0	0	0	6	24	8	39
Penn State	3,492	5,588	7,775	3,221	2,828	5,773	1,872	31275
Phil College of Textiles	11	6	5	0	0	0	0	23
Phila College of Pharmacy	6	0	0	0	0	8	3	21
Philadelphia College of Bible	2	3	1	0	87	125	45	263
Point Park College	61	234	171	63	90	190	87	896
Robert Morris College	0	21	68	73	79	157	54	452
Rosemont College	111	108	159	70	87	119	77	761
Seton Hill College	259	352	412	225	270	360	129	2115
Shippensburg U of Pa	1,455	2,437	2,564	1,058	1,012	2,019	871	11662
Slippery Rock U of Pa	1,410	3,092	4,009	1,737	1,738	2,714	944	15879
St Bonaventure U, NY	0	0	13	63	79	56	46	257
St Charles Seminary	9	12	0	0	0	0	0	23
St Francis College	378	506	386	142	151	228	78	1916
St Josephs U	292	513	566	180	229	673	315	2803

[continued on next page]

Institution	66-70	71-5	76-80	81-85	96-90	91-95	96-97	Total 51-97
St Vincent College	95	138	80	56	90	201	89	764
Susquehanna U	199	226	331	140	132	225	90	1388
Swarthmore College	26	72	77	39	39	46	16	323
Temple U	2,681	4,111	6,735	2,935	1,996	3,158	1,282	23882
Thiel College	191	263	225	55	61	73	32	938
U of Pennsylvania	680	872	1,150	552	505	736	291	5108
U of Pittsburgh	1,348	3,108	4,471	2,106	2,163	2,947	1,276	17864
U of Scranton	214	358	683	296	339	544	265	2732
U of the Arts	172	162	194	82	59	108	40	842
Unknown	0	0	1	32	68	106	72	280
Unknown/Out of State	12,851	13,546	22,270	17,977	19,857	26,621	10,484	139583
Ursinus College	226	300	353	135	110	147	57	1392
Villa Maria College	285	311	246	144	104	43	10	1241
Villanova U	264	813	1,266	432	426	469	145	4071
Washington and Jefferson	43	90	100	42	45	79	25	431
Waynesburgh College	291	286	174	77	99	171	56	1208
West Chester U of Pa	2,119	3,563	4,899	2,175	1,730	3,619	1,397	20094
Westminister College	560	811	1,003	467	363	564	246	4109
Widener U	60	143	108	103	339	995	487	2236
Wilkes U	451	670	781	202	241	377	116	2870
Wilson College	124	126	78	13	92	263	126	845
York College of Pa	1	93	207	118	188	540	195	1342
Total	55,508	83,668	112,381	58,332	58,592	94,303	37,399	526,667
Annual Average	11,102	16,734	22,476	11,666	11,718	18,861	18,700	NA

Source: Tabulations of Professional Certification File.

Table 5.15: Education Certificates Aggregated to General Certification Areas Across Time

Certification Area	66-70	71-75	76-80	81-85	86-90	91-95	96-97	Total
Adm/Supervisory	1,476	3,444	5,214	5,009	4,753	4,898	2,147	28,202
Agriculture	17	42	59	64	32	31	14	286
Art	1,508	3,095	2,617	1,279	1,038	1,786	708	12,452
Biology	841	1,409	938	667	901	1,120	554	6,611
Business Education	1,238	1,718	1,312	913	772	860	344	7,658
Chemistry	238	537	355	289	387	529	298	2,675
Coordinate Services	3,387	8,113	6,824	3,820	4,186	6,588	3,011	36,619
Driver Education	346	926	781	343	232	279	85	3,133
Early Childhood	320	1,382	3,260	3,080	3,304	6,438	2,428	20,492
Earth/Space	178	446	300	148	180	292	113	1,678
English	5,258	8,384	4,818	2,750	2,714	4,865	1,929	31,596
French	1,015	1,560	679	385	330	477	205	4,912
General Elementary	17,374	31,512	20,020	11,432	13,892	28,316	11,017	138,934
General Science	1,580	1,900	1,215	995	975	1,569	679	9,556
German	317	577	333	189	134	217	86	1,931
Health/Phys Education	2,097	5,275	4,348	2,951	1,754	2,660	1,106	20,517
Hearing Impaired	68	205	380	344	267	308	158	1,747
Home Economics	1,297	2,094	1,499	659	364	333	166	6,801
Industrial Arts	554	1,154	1,133	795	458	493	230	5,045
Mathematics	2,572	4,419	2,469	1,580	2,565	4,087	1,552	19,684
Mental/Phys Handi	1,780	4,214	6,266	5,543	4,542	6,586	3,260	32,536
Music	1,568	3,244	3,415	2,074	1,604	2,287	818	15,310
Not Listed Elsewhere	588	2,633	5,423	3,817	5,304	7,327	1,652	26,829
Other Handicapped	139	864	1,255	251	91	64	17	2,684
Other Languages	271	287	173	120	135	175	69	1,369
Other Science	143	52	19	31	14	3	0	507
Physics	243	490	302	169	225	512	230	2,219
Reading Specialists	411	2,106	4,035	2,743	2,145	2,856	1,085	15,417
Social Studies	5,964	9,841	4,818	2,607	2,842	4,982	1,895	35,346
Spanish	961	1,747	997	550	551	1,007	515	6,550
Speech/Lang Impaired	511	1,385	1,980	1,302	814	853	343	7,300
Visually Impaired	55	151	228	157	134	291	119	1,145
Vocational Education	1,045	1,253	1,844	1,198	870	1,101	516	8,006
Vocational Health	86	46	84	27	34	61	36	381
Vocational Tech Educt	61	78	69	51	50	53	27	392
Total	55,509	106,586	89,462	58,332	58,593	94,304	37,412	516,526

Source: Tabulations of Professional Certification File.

These teacher preparation figures need to be compared to predicted teacher needs based on student demographics as well as teacher demographics. Table 5.16 displays the results of some fairly complicated simulations at the school district level, and then aggregated to state-wide totals. The methodology is developed in Strauss(1993) and assumes that future teacher- ratios and curricula will remain stable. As the age distribution of students (and total enrollments) change, one need only specify retirement assumptions for teachers to determine hiring needs across time. In the analysis discussed below, no projections for special education students are available, so that the classroom teacher force totals 82,412 in 1996/7, the base year, rather than about 102,000.

Three different retirement assumptions are entertained:

1. Teachers will retire at age 65;
2. Teachers will retire upon reaching 30 years of service;
3. Teachers will retire when they have achieved 27 years of service and age 55 (the incentives in place in 1993).

Table 5.16 shows for aggregated certification areas:

- The total number of teachers in 1996/7 (column 2);
- The average number of voluntary quits (for reasons other than retirement) in that certification area based on the last 10 years of experience (column 3);
- The total predicted number of hires (if retirements occur at age 65) which will occur in school years 1997-8 through 2005-6 (column 4);
- The total predicted number of hires (if retirements occur with 30 years of experience) which will occur in school years 1997-8 through 2005-6 (column 5);
- The total predicted number of hires (if retirements occur with 27 years of experience and age 55) which will occur in school years 1997-8 through 2005-6 (column 6);
- The total number of voluntary quits across the forecast period (column 7);
- The sum of age 65 retirements plus voluntary quits (column 8);
- The sum of 30 years of experience retirements plus voluntary quits (column 9);
- The sum of 27 years of experience and age 55 retirements plus voluntary quits (column 10);
- The ratio of column 9 to column 2 (the 1996/7 teacher inventory) or the replacement rate over the forecast period with an age 65 retirement assumption (column 11);
- The ratio of column 10 to column 2 (the 1996/7 teacher inventory) or the replacement rate over the forecast period with a retirement assumption of 30 years of experience (column 12);
- The ratio of column 11 to column 2 (the 1996/7 teacher inventory) or the replacement rate over the forecast period with an age 55 and 27 years of experience retirement assumption (column 13).

Inspection of these predictions reveal several important findings:

1. The net number of elementary teachers will **decline** overall across the next nine years by 1,400 teachers if elementary school teachers wait until they are 65 to retire. Under the other retirement assumptions, around 11-14,000 elementary school teachers will be needed, of whom 5,000 will be due to quits.

2. If teachers do not wait until age 65, the numbers of teachers needed jumps dramatically to somewhere between 46,000 and 50,000 or anywhere from 56% to 61% of the non-special education 1996/7 stock of employed classroom teachers.

3. When one combines the predictions with historical teacher production levels, it is difficult to reach the conclusion that there will be teacher shortages. Table 5.25 indicates that there are large numbers of certificated teachers produced during the 1980s and 1990s who actually outnumber the number of employed teachers by about 2:1 overall. In areas such as elementary education, mathematics, English and social studies, vast numbers of teachers were trained. The ratio of hiring needs or demand to this measure of supply is anywhere from 12% to 65%, depending on the certification area in question.

   Several conclusions suggest themselves from this analysis: 1) the public education system has an opportunity to employ younger teachers, who presumably will be considerably less expensive than those retiring, and an opportunity to employ new teachers able to ensure that students meet high learning standards, and 2) the problem local districts will face will involve how to choose wisely among many applicants.

Whether local school boards will pass on these budgetary savings to local taxpayers, or whether the General Assembly will simply reduce state aid to education remain open questions. Undoubtedly there are other, non-personnel local education needs in both capital and operating areas.

5.7 Supply/Demand Interactions: Net Hiring Needs through 2006

Table 5.16: Pennsylvania Classroom Teacher Hiring Needs: 1997-2005

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	162	8	13	58	52	72	85	130	124	53%	80%	77%
Art	1,532	46	121	778	688	414	535	1,192	1,102	35%	78%	72%
Biology	1,858	32	330	1,084	1,026	288	618	1,372	1,314	33%	74%	71%
Business Educ	1,926	42	385	1,182	1,119	378	763	1,560	1,497	40%	81%	78%
Chemistry	967	24	168	522	491	216	384	738	707	40%	76%	73%
Driver Education	226	3	43	171	161	27	70	198	188	31%	88%	83%
Early Childhood	1,385	26	(100)	184	121	234	134	418	355	10%	30%	26%
Earth/Space	612	11	81	386	334	99	180	485	433	29%	79%	71%
English	6,662	102	1,122	4,106	3,860	918	2,040	5,024	4,778	31%	75%	72%
French	786	19	123	462	442	171	294	633	613	37%	81%	78%
General Elementary	39,787	559	(1,388)	13,826	11,559	5,031	3,643	18,857	16,590	9%	47%	42%
General Science	2,027	38	325	1,197	1,143	342	667	1,539	1,485	33%	76%	73%
German	402	10	69	239	229	90	159	329	319	40%	82%	79%
Health/Phys Educ	3,123	73	325	1,823	1,567	657	982	2,480	2,224	31%	79%	71%
Home Economics	1,652	30	316	877	775	270	586	1,147	1,045	36%	69%	63%
Industrial Arts	1,939	34	281	1,192	1,042	306	587	1,498	1,348	30%	77%	70%
Mathematics	6,067	94	906	3,653	3,380	846	1,752	4,499	4,226	29%	74%	70%
Music	1,834	97	117	728	594	873	990	1,601	1,467	54%	87%	80%
Other Languages	178	5	40	93	87	45	85	138	132	48%	78%	74%
Other Science	28	0	3	15	14	0	3	15	14	11%	54%	50%
Physics	544	12	93	280	267	108	201	388	375	37%	71%	69%
Social Studies	5,782	66	1,061	3,804	3,627	594	1,655	4,398	4,221	29%	76%	73%
Spanish	1,559	28	238	714	691	252	490	966	943	31%	62%	61%
Vocational Educ	532	22	130	241	262	198	328	439	460	62%	83%	87%
Vocational Health	30	1	11	8	15	9	20	17	24	67%	57%	80%
Vocational Tech	226	5	26	115	99	45	71	160	144	31%	71%	64%
Total	82,412	1,394	4,875	38,044	33,934	12,546	17,421	50,590	46,480	21%	61%	56%

Source: Supply and Demand Simulation Model

Table 5.17: Projected Hiring Needs by MSA: Allentown and Altoona

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Allentown)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Art	94	2	11	51	45	18	29	69	63	30.9%	73.4%	67.0%
Biology	114	1	23	70	67	9	32	79	76	28.1%	69.3%	66.7%
Business Educ	111	2	23	76	70	18	41	94	88	36.9%	84.7%	79.3%
Chemistry	46	1	15	34	32	9	24	43	41	52.2%	93.5%	89.1%
Driver Education	13	0	7	14	13	0	7	14	13	53.8%	107.7%	100.0%
Early Childhood	31	1	-2	2	4	9	7	11	13	22.6%	35.5%	41.9%
Earth/Space	31	1	4	23	14	9	13	32	23	41.9%	103.2%	74.2%
English	339	4	70	220	209	36	106	256	245	31.3%	75.5%	72.3%
French	31	1	8	22	22	9	17	31	31	54.8%	100.0%	100.0%
General Elementary	2,013	21	-102	639	526	189	87	828	715	4.3%	41.1%	35.5%
General Science	95	2	16	48	49	18	34	66	67	35.8%	69.5%	70.5%
German	44	1	11	27	24	9	20	36	33	45.5%	81.8%	75.0%
Health/Phys Educ	184	2	28	117	100	18	46	135	118	25.0%	73.4%	64.1%
Home Economics	80	2	19	47	43	18	37	65	61	46.3%	81.3%	76.3%
Industrial Arts	92	1	21	67	61	9	30	76	70	32.6%	82.6%	76.1%
Mathematics	288	3	60	200	181	27	87	227	208	30.2%	78.8%	72.2%
Music	120	6	3	47	38	54	57	101	92	47.5%	84.2%	76.7%
Other Languages	6	0	2	2	3	0	2	2	3	33.3%	33.3%	50.0%
Other Science	2	0	0	1	1	0	0	1	1	0.0%	50.0%	50.0%
Physics	26	0	6	17	14	0	6	17	14	23.1%	65.4%	53.8%
Social Studies	305	2	69	220	207	18	87	238	225	28.5%	78.0%	73.8%
Spanish	83	1	15	39	41	9	24	48	50	28.9%	57.8%	60.2%
Vocational Educ	9	0	1	4	4	0	1	4	4	11.1%	44.4%	44.4%
Vocational Tech	9	0	0	3	2	0	0	3	2	0.0%	33.3%	22.2%
MSA Total	4,192	54	307	2,004	1,780	486	793	2,490	2,266	18.9%	59.4%	54.1%
(Altoona)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	4	0	0	1	1	0	0	1	1	0.0%	25.0%	25.0%
Art	25	0	2	15	13	0	2	15	13	8.0%	60.0%	52.0%
Biology	22	0	0	10	9	0	0	10	9	0.0%	45.5%	40.9%
Business Educ	21	1	4	9	9	9	13	18	18	61.9%	85.7%	85.7%
Chemistry	14	0	4	5	5	0	4	5	5	28.6%	35.7%	35.7%
Driver Education	2	0	1	1	1	0	1	1	1	50.0%	50.0%	50.0%
Early Childhood	21	0	1	5	4	0	1	5	4	4.8%	23.8%	19.0%
Earth/Space	9	0	1	6	6	0	1	6	6	11.1%	66.7%	66.7%
English	75	1	2	36	30	9	11	45	39	14.7%	60.0%	52.0%
French	9	0	0	4	3	0	0	4	3	0.0%	44.4%	33.3%
General Elementary	407	2	25	197	178	18	43	215	196	10.6%	52.8%	48.2%
General Science	26	1	2	16	14	9	11	25	23	42.3%	96.2%	88.5%
German	4	0	0	3	2	0	0	3	2	0.0%	75.0%	50.0%
Health/Phys Educ	46	0	4	28	22	0	4	28	22	8.7%	60.9%	47.8%
Home Economics	21	1	2	9	6	9	11	18	15	52.4%	85.7%	71.4%
Industrial Arts	15	1	0	6	5	9	9	15	14	60.0%	100.0%	93.3%
Mathematics	70	1	0	31	31	9	9	40	40	12.9%	57.1%	57.1%
Music	33	1	3	16	13	9	12	25	22	36.4%	75.8%	66.7%
Other Languages	1	0	0	1	1	0	0	1	1	0.0%	100.0%	100.0%
Physics	7	0	0	2	2	0	0	2	2	0.0%	28.6%	28.6%
Social Studies	78	0	3	33	26	0	3	33	26	3.8%	42.3%	33.3%
Spanish	11	0	0	5	4	0	0	5	4	0.0%	45.5%	36.4%
Vocational Educ	10	1	2	7	6	9	11	16	15	110.0%	160.0%	150.0%
Vocational Health	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Vocational Tech	9	0	1	1	1	0	1	1	1	11.1%	11.1%	11.1%
MSA Total	964	10	59	459	403	90	149	549	493	15.5%	57.0%	51.1%

Source: Supply and Demand Model.

Table 5.18: Projected Hiring Needs by MSA: Erie and Harrisburg

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Erie)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	2	0	0	2	2	0	0	2	2	0.0%	100.0%	100.0%
Art	48	1	3	21	20	9	12	30	29	25.0%	62.5%	60.4%
Biology	34	1	7	24	24	9	16	33	33	47.1%	97.1%	97.1%
Business Educ	49	0	7	20	18	0	7	20	18	14.3%	40.8%	36.7%
Chemistry	26	1	2	10	11	9	11	19	20	42.3%	73.1%	76.9%
Driver Education	4	0	3	4	4	0	3	4	4	75.0%	100.0%	100.0%
Early Childhood	12	0	0	5	2	0	0	5	2	0.0%	41.7%	16.7%
Earth/Space	16	1	2	9	6	9	11	18	15	68.8%	112.5%	93.8%
English	158	2	11	73	71	18	29	91	89	18.4%	57.6%	56.3%
French	13	0	1	8	7	0	1	8	7	7.7%	61.5%	53.8%
General Elementary	953	12	64	392	361	108	172	500	469	18.0%	52.5%	49.2%
General Science	47	1	6	23	22	9	15	32	31	31.9%	68.1%	66.0%
German	4	0	0	3	3	0	0	3	3	0.0%	75.0%	75.0%
Health/Phys Educ	92	2	5	50	41	18	23	68	59	25.0%	73.9%	64.1%
Home Economics	47	1	5	16	15	9	14	25	24	29.8%	53.2%	51.1%
Industrial Arts	52	1	4	31	28	9	13	40	37	25.0%	76.9%	71.2%
Mathematics	130	2	7	68	62	18	25	86	80	19.2%	66.2%	61.5%
Music	48	1	4	20	16	9	13	29	25	27.1%	60.4%	52.1%
Other Languages	2	0	1	1	1	0	1	1	1	50.0%	50.0%	50.0%
Other Science	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Physics	12	0	1	5	6	0	1	5	6	8.3%	41.7%	50.0%
Social Studies	139	2	11	70	68	18	29	88	86	20.9%	63.3%	61.9%
Spanish	28	1	3	9	10	9	12	18	19	42.9%	64.3%	67.9%
Vocational Educ	27	1	5	7	6	9	14	16	15	51.9%	59.3%	55.6%
Vocational Health	3	0	0	1	1	0	0	1	1	0.0%	33.3%	33.3%
Vocational Tech	7	0	0	2	2	0	0	2	2	0.0%	28.6%	28.6%
MSA Total	1,970	30	152	884	817	270	422	1,154	1,087	21.4%	58.6%	55.2%
(Harrisburg)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	11	1	1	3	3	9	10	12	12	90.9%	109.1%	109.1%
Art	100	2	14	47	48	18	32	65	66	32.0%	65.0%	66.0%
Biology	113	2	22	73	66	18	40	91	84	35.4%	80.5%	74.3%
Business Educ	133	3	17	75	72	27	44	102	99	33.1%	76.7%	74.4%
Chemistry	55	1	11	33	30	9	20	42	39	36.4%	76.4%	70.9%
Driver Education	29	0	4	19	17	0	4	19	17	13.8%	65.5%	58.6%
Early Childhood	97	1	-11	11	10	9	-2	20	19	(2.1%)	20.6%	19.6%
Earth/Space	47	2	7	29	25	18	25	47	43	53.2%	100.0%	91.5%
English	396	9	72	223	207	81	153	304	288	38.6%	76.8%	72.7%
French	44	1	5	23	22	9	14	32	31	31.8%	72.7%	70.5%
General Elementary	2,259	38	-31	759	682	342	311	1,101	1024	13.8%	48.7%	45.3%
General Science	111	3	17	59	56	27	44	86	83	39.6%	77.5%	74.8%
German	28	1	4	16	14	9	13	25	23	46.4%	89.3%	82.1%
Health/Phys Educ	197	4	23	107	93	36	59	143	129	29.9%	72.6%	65.5%
Home Economics	105	2	22	56	48	18	40	74	66	38.1%	70.5%	62.9%
Industrial Arts	124	2	14	64	53	18	32	82	71	25.8%	66.1%	57.3%
Mathematics	342	7	60	186	171	63	123	249	234	36.0%	72.8%	68.4%
Music	137	6	7	57	49	54	61	111	103	44.5%	81.0%	75.2%
Other Languages	16	1	4	9	6	9	13	18	15	81.3%	112.5%	93.8%
Physics	28	1	2	10	8	9	11	19	17	39.3%	67.9%	60.7%
Social Studies	356	7	60	221	208	63	123	284	271	34.6%	79.8%	76.1%
Spanish	93	2	18	43	42	18	36	61	60	38.7%	65.6%	64.5%
Vocational Educ	37	1	12	22	22	9	21	31	31	56.8%	83.8%	83.8%
Vocational Tech	11	0	1	4	3	0	1	4	3	9.1%	36.4%	27.3%
MSA Total	4,911	99	360	2,169	1,976	891	1,251	3,060	2867	25.5%	62.3%	58.4%

Source: Supply and Demand Model.

Table 5.19: Projected Hiring Needs by MSA: Johnstown and Lancaster

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Johnstown)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	5	0	0	2	2	0	0	2	2	0.0%	40.0%	40.0%
Art	31	1	2	15	12	9	11	24	21	35.5%	77.4%	67.7%
Biology	34	0	-2	11	10	0	-2	11	10	(5.9%)	32.4%	29.4%
Business Educ	50	1	4	24	23	9	13	33	32	26.0%	66.0%	64.0%
Chemistry	28	0	-1	12	10	0	-1	12	10	(3.6%)	42.9%	35.7%
Driver Education	9	0	-1	7	7	0	-1	7	7	(11.1%)	77.8%	77.8%
Early Childhood	27	0	-2	3	1	0	-2	3	1	(7.4%)	11.1%	3.7%
Earth/Space	17	0	1	7	7	0	1	7	7	5.9%	41.2%	41.2%
English	134	3	-4	57	47	27	23	84	74	17.2%	62.7%	55.2%
French	13	1	0	4	3	9	9	13	12	69.2%	100.0%	92.3%
General Elementary	786	7	-6	399	296	63	57	462	359	7.3%	58.8%	45.7%
General Science	31	1	-3	10	8	9	6	19	17	19.4%	61.3%	54.8%
German	5	0	1	2	1	0	1	2	1	20.0%	40.0%	20.0%
Health/Phys Educ	58	1	2	31	28	9	11	40	37	19.0%	69.0%	63.8%
Home Economics	32	0	1	9	9	0	1	9	9	3.1%	28.1%	28.1%
Industrial Arts	46	0	1	20	14	0	1	20	14	2.2%	43.5%	30.4%
Mathematics	139	2	-1	51	44	18	17	69	62	12.2%	49.6%	44.6%
Music	29	2	-1	9	5	18	17	27	23	58.6%	93.1%	79.3%
Physics	9	0	1	5	5	0	1	5	5	11.1%	55.6%	55.6%
Social Studies	121	2	2	61	64	18	20	79	82	16.5%	65.3%	67.8%
Spanish	33	1	-2	8	8	9	7	17	17	21.2%	51.5%	51.5%
Vocational Educ	8	0	1	3	3	0	1	3	3	12.5%	37.5%	37.5%
Vocational Health	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Vocational Tech	10	0	0	6	4	0	0	6	4	0.0%	60.0%	40.0%
MSA Total	1,670	22	-7	761	615	198	191	959	813	11.4%	57.4%	48.7%
(Lancaster)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	18	1	1	9	7	9	10	18	16	55.6%	100.0%	88.9%
Art	72	2	12	36	34	18	30	54	52	41.7%	75.0%	72.2%
Biology	74	1	11	40	37	9	20	49	46	27.0%	66.2%	62.2%
Business Educ	67	2	9	38	31	18	27	56	49	40.3%	83.6%	73.1%
Chemistry	30	1	7	12	12	9	16	21	21	53.3%	70.0%	70.0%
Driver Education	9	1	3	8	9	9	12	17	18	133.3%	188.9%	200.0%
Early Childhood	62	1	-1	8	7	9	8	17	16	12.9%	27.4%	25.8%
Earth/Space	34	1	1	12	11	9	10	21	20	29.4%	61.8%	58.8%
English	242	5	60	126	127	45	105	171	172	43.4%	70.7%	71.1%
French	18	0	3	9	8	0	3	9	8	16.7%	50.0%	44.4%
General Elementary	1,461	30	22	414	372	270	292	684	642	20.0%	46.8%	43.9%
General Science	67	2	13	40	36	18	31	58	54	46.3%	86.6%	80.6%
German	21	0	4	14	14	0	4	14	14	19.0%	66.7%	66.7%
Health/Phys Educ	141	4	17	65	57	36	53	101	93	37.6%	71.6%	66.0%
Home Economics	69	1	15	38	34	9	24	47	43	34.8%	68.1%	62.3%
Industrial Arts	92	3	10	44	39	27	37	71	66	40.2%	77.2%	71.7%
Mathematics	219	5	43	114	109	45	88	159	154	40.2%	72.6%	70.3%
Music	73	3	9	16	16	27	36	43	43	49.3%	58.9%	58.9%
Other Languages	2	0	1	1	1	0	1	1	1	50.0%	50.0%	50.0%
Physics	16	0	3	10	10	0	3	10	10	18.8%	62.5%	62.5%
Social Studies	232	2	52	131	123	18	70	149	141	30.2%	64.2%	60.8%
Spanish	55	2	7	16	16	18	25	34	34	45.5%	61.8%	61.8%
Vocational Educ	8	0	2	3	3	0	2	3	3	25.0%	37.5%	37.5%
Vocational Tech	8	0	0	2	2	0	0	2	2	0.0%	25.0%	25.0%
MSA Total	3,105	67	306	1,209	1,119	603	909	1,812	1,722	29.3%	58.4%	55.5%

Source: Supply and Demand Model.

Table 5.20: Projected Hiring Needs by MSA: Scranton and Philadelphia

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Scranton)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	4	1	0	0	0	9	9	9	9	225.0%	225.0%	225.0%
Art	81	3	9	43	39	27	36	70	66	44.4%	86.4%	81.5%
Biology	117	2	37	90	83	18	55	108	101	47.0%	92.3%	86.3%
Business Educ	132	4	38	102	101	36	74	138	137	56.1%	104.5%	103.8%
Chemistry	60	1	14	35	29	9	23	44	38	38.3%	73.3%	63.3%
Driver Education	17	0	6	16	16	0	6	16	16	35.3%	94.1%	94.1%
Early Childhood	54	1	-1	11	6	9	8	20	15	14.8%	37.0%	27.8%
Earth/Space	50	0	11	37	32	0	11	37	32	22.0%	74.0%	64.0%
English	431	7	90	299	276	63	153	362	339	35.5%	84.0%	78.7%
French	51	0	13	40	38	0	13	40	38	25.5%	78.4%	74.5%
General Elementary	2,364	23	13	1,203	916	207	220	1,410	1123	9.3%	59.6%	47.5%
General Science	116	2	18	67	70	18	36	85	88	31.0%	73.3%	75.9%
German	24	0	5	20	17	0	5	20	17	20.8%	83.3%	70.8%
Health/Phys Educ	174	4	32	111	87	36	68	147	123	39.1%	84.5%	70.7%
Home Economics	100	1	29	60	56	9	38	69	65	38.0%	69.0%	65.0%
Industrial Arts	121	2	25	82	74	18	43	100	92	35.5%	82.6%	76.0%
Mathematics	388	7	84	247	229	63	147	310	292	37.9%	79.9%	75.3%
Music	100	5	10	47	33	45	55	92	78	55.0%	92.0%	78.0%
Other Languages	9	0	2	5	4	0	2	5	4	22.2%	55.6%	44.4%
Other Science	2	0	0	2	2	0	0	2	2	0.0%	100.0%	100.0%
Physics	40	0	9	27	26	0	9	27	26	22.5%	67.5%	65.0%
Social Studies	385	5	82	285	280	45	127	330	325	33.0%	85.7%	84.4%
Spanish	87	1	21	54	51	9	30	63	60	34.5%	72.4%	69.0%
Vocational Educ	13	3	2	6	6	27	29	33	33	223.1%	253.8%	253.8%
Vocational Tech	14	0	2	10	7	0	2	10	7	14.3%	71.4%	50.0%
MSA Total	4,964	72	552	2,922	2,496	648	1,200	3,570	3144	24.2%	71.9%	63.3%
(Philadelphia)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	20	1	4	4	6	9	13	13	15	65.0%	65.0%	75.0%
Art	267	16	23	121	111	144	167	265	255	62.5%	99.3%	95.5%
Biology	482	9	119	302	294	81	200	383	375	41.5%	79.5%	77.8%
Business Educ	450	8	129	334	312	72	201	406	384	44.7%	90.2%	85.3%
Chemistry	232	7	69	148	143	63	132	211	206	56.9%	90.9%	88.8%
Driver Education	13	1	4	11	10	9	13	20	19	100.0%	153.8%	146.2%
Early Childhood	550	16	-89	-41	-44	144	55	103	100	10.0%	18.7%	18.2%
Earth/Space	111	2	28	79	69	18	46	97	87	41.4%	87.4%	78.4%
English	1,778	26	456	1,257	1,212	234	690	1,491	1,446	38.8%	83.9%	81.3%
French	228	6	56	147	146	54	110	201	200	48.2%	88.2%	87.7%
General Elementary	11,870	248	-1,226	2,082	1,847	2,232	1,006	4,314	4,079	8.5%	36.3%	34.4%
General Science	580	12	144	391	382	108	252	499	490	43.4%	86.0%	84.5%
German	76	2	22	51	51	18	40	69	69	52.6%	90.8%	90.8%
Health/Phys Educ	540	26	107	363	328	234	341	597	562	63.1%	110.6%	104.1%
Home Economics	381	8	108	233	224	72	180	305	296	47.2%	80.1%	77.7%
Industrial Arts	403	10	102	271	256	90	192	361	346	47.6%	89.6%	85.9%
Mathematics	1,657	26	375	1,141	1,085	234	609	1,375	1,319	36.8%	83.0%	79.6%
Music	323	26	21	127	113	234	255	361	347	78.9%	111.8%	107.4%
Other Languages	70	2	18	42	44	18	36	60	62	51.4%	85.7%	88.6%
Other Science	8	0	1	2	2	0	1	2	2	12.5%	25.0%	25.0%
Physics	152	4	35	77	80	36	71	113	116	46.7%	74.3%	76.3%
Social Studies	1,376	16	390	1,026	1,004	144	534	1,170	1,148	38.8%	85.0%	83.4%
Spanish	517	9	107	256	251	81	188	337	332	36.4%	65.2%	64.2%
Vocational Educ	217	12	73	100	127	108	181	208	235	83.4%	95.9%	108.3%
Vocational Health	16	1	9	5	10	9	18	14	19	112.5%	87.5%	118.8%
Vocational Tech	58	2	13	35	30	18	31	53	48	53.4%	91.4%	82.8%
MSA Total	22,550	499	1,110	8,641	8,173	4,491	5,601	13,132	12,664	24.8%	58.2%	56.2%

Source: Supply and Demand Model.

Table 5.21: Projected Hiring Needs by MSA: Pittsburgh and Reading

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Pittsburgh)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	4	0	0	3	2	0	0	3	2	0.0%	75.0%	50.0%
Art	335	5	10	194	164	45	55	239	209	16.4%	71.3%	62.4%
Biology	300	5	49	199	189	45	94	244	234	31.3%	81.3%	78.0%
Business Educ	288	6	61	149	153	54	115	203	207	39.9%	70.5%	71.9%
Chemistry	177	3	20	101	94	27	47	128	121	26.6%	72.3%	68.4%
Driver Education	24	0	3	20	19	0	3	20	19	12.5%	83.3%	79.2%
Early Childhood	230	2	-18	57	34	18	0	75	52	0.0%	32.6%	22.6%
Earth/Space	108	1	12	79	74	9	21	88	83	19.4%	81.5%	76.9%
English	1,143	10	172	802	766	90	262	892	856	22.9%	78.0%	74.9%
French	176	4	17	94	96	36	53	130	132	30.1%	73.9%	75.0%
General Elementary	6,310	56	-462	2,642	2,136	504	42	3,146	2,640	0.7%	49.9%	41.8%
General Science	349	5	54	236	220	45	99	281	265	28.4%	80.5%	75.9%
German	77	3	8	43	40	27	35	70	67	45.5%	90.9%	87.0%
Health/Phys Educ	643	7	38	407	346	63	101	470	409	15.7%	73.1%	63.6%
Home Economics	304	6	57	166	147	54	111	220	201	36.5%	72.4%	66.1%
Industrial Arts	342	3	50	240	214	27	77	267	241	22.5%	78.1%	70.5%
Mathematics	1,027	10	137	693	657	90	227	783	747	22.1%	76.2%	72.7%
Music	387	11	15	156	131	99	114	255	230	29.5%	65.9%	59.4%
Other Languages	32	1	6	11	10	9	15	20	19	46.9%	62.5%	59.4%
Other Science	5	0	1	4	4	0	1	4	4	20.0%	80.0%	80.0%
Physics	113	2	23	63	61	18	41	81	79	36.3%	71.7%	69.9%
Social Studies	993	8	175	725	691	72	247	797	763	24.9%	80.3%	76.8%
Spanish	284	3	38	151	144	27	65	178	171	22.9%	62.7%	60.2%
Vocational Educ	101	2	15	36	38	18	33	54	56	32.7%	53.5%	55.4%
Vocational Health	4	0	0	1	2	0	0	1	2	0.0%	25.0%	50.0%
Vocational Tech	44	1	6	28	26	9	15	37	35	34.1%	84.1%	79.5%
MSA Total	13,913	155	493	7,376	6,525	1,395	1,888	8,771	7,920	13.6%	63.0%	56.9%
(Reading)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	8	1	1	6	4	9	10	15	13	125.0%	187.5%	162.5%
Art	68	0	10	30	30	0	10	30	30	14.7%	44.1%	44.1%
Biology	66	1	15	40	39	9	24	49	48	36.4%	74.2%	72.7%
Business Educ	67	1	16	47	40	9	25	56	49	37.3%	83.6%	73.1%
Chemistry	32	0	7	14	16	0	7	14	16	21.9%	43.8%	50.0%
Driver Education	8	0	1	4	4	0	1	4	4	12.5%	50.0%	50.0%
Early Childhood	26	0	4	6	6	0	4	6	6	15.4%	23.1%	23.1%
Earth/Space	28	0	6	19	18	0	6	19	18	21.4%	67.9%	64.3%
English	218	4	53	141	134	36	89	177	170	40.8%	81.2%	78.0%
French	14	0	2	9	7	0	2	9	7	14.3%	64.3%	50.0%
General Elementary	1,324	15	-23	426	388	135	112	561	523	8.5%	42.4%	39.5%
General Science	65	1	13	44	42	9	22	53	51	33.8%	81.5%	78.5%
German	25	1	3	16	15	9	12	25	24	48.0%	100.0%	96.0%
Health/Phys Educ	130	3	22	81	75	27	49	108	102	37.7%	83.1%	78.5%
Home Economics	61	1	14	40	38	9	23	49	47	37.7%	80.3%	77.0%
Industrial Arts	81	1	12	53	48	9	21	62	57	25.9%	76.5%	70.4%
Mathematics	196	3	46	133	125	27	73	160	152	37.2%	81.6%	77.6%
Music	78	3	13	40	32	27	40	67	59	51.3%	85.9%	75.6%
Other Languages	5	0	0	3	2	0	0	3	2	0.0%	60.0%	40.0%
Physics	13	1	2	6	6	9	11	15	15	84.6%	115.4%	115.4%
Social Studies	215	2	56	161	149	18	74	179	167	34.4%	83.3%	77.7%
Spanish	50	0	11	24	22	0	11	24	22	22.0%	48.0%	44.0%
Vocational Educ	4	0	2	1	3	0	2	1	3	50.0%	25.0%	75.0%
Vocational Tech	7	0	1	2	2	0	1	2	2	14.3%	28.6%	28.6%
MSA Total	2,813	38	289	1,358	1,256	342	631	1,700	1,598	22.4%	60.4%	56.8%

Source: Supply and Demand Model.

Table 5.22: Projected Hiring Needs by MSA: Sharon and State College

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Sharon)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Art	21	1	3	13	11	9	12	22	20	57.1%	104.8%	95.2%
Biology	23	0	2	10	7	0	2	10	7	8.7%	43.5%	30.4%
Business Educ	12	0	1	4	4	0	1	4	4	8.3%	33.3%	33.3%
Chemistry	15	1	1	4	4	9	10	13	13	66.7%	86.7%	86.7%
Driver Education	2	0	1	1	2	0	1	1	2	50.0%	50.0%	100.0%
Early Childhood	11	0	1	7	6	0	1	7	6	9.1%	63.6%	54.5%
Earth/Space	6	0	0	4	4	0	0	4	4	0.0%	66.7%	66.7%
English	81	2	0	35	33	18	18	53	51	22.2%	65.4%	63.0%
French	8	0	0	1	3	0	0	1	3	0.0%	12.5%	37.5%
General Elementary	426	5	-20	173	134	45	25	218	179	5.9%	51.2%	42.0%
General Science	24	0	2	13	12	0	2	13	12	8.3%	54.2%	50.0%
German	3	0	0	3	3	0	0	3	3	0.0%	100.0%	100.0%
Health/Phys Educ	42	1	2	23	20	9	11	32	29	26.2%	76.2%	69.0%
Home Economics	14	0	0	5	3	0	0	5	3	0.0%	35.7%	21.4%
Industrial Arts	23	2	1	13	10	18	19	31	28	82.6%	134.8%	121.7%
Mathematics	68	1	1	30	27	9	10	39	36	14.7%	57.4%	52.9%
Music	21	1	2	6	6	9	11	15	15	52.4%	71.4%	71.4%
Other Languages	3	0	1	2	1	0	1	2	1	33.3%	66.7%	33.3%
Physics	5	0	0	2	2	0	0	2	2	0.0%	40.0%	40.0%
Social Studies	70	1	10	44	42	9	19	53	51	27.1%	75.7%	72.9%
Spanish	12	0	0	1	1	0	0	1	1	0.0%	8.3%	8.3%
Vocational Educ	8	0	1	1	1	0	1	1	1	12.5%	12.5%	12.5%
Vocational Tech	3	0	0	2	2	0	0	2	2	0.0%	66.7%	66.7%
MSA Total	907	15	9	400	341	135	144	535	476	15.9%	59.0%	52.5%
(State College)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	3	0	1	1	2	0	1	1	2	33.3%	33.3%	66.7%
Art	10	1	0	4	4	9	9	13	13	90.0%	130.0%	130.0%
Biology	10	0	4	5	6	0	4	5	6	40.0%	50.0%	60.0%
Business Educ	13	0	6	8	10	0	6	8	10	46.2%	61.5%	76.9%
Chemistry	10	0	2	7	5	0	2	7	5	20.0%	70.0%	50.0%
Driver Education	5	0	1	2	2	0	1	2	2	20.0%	40.0%	40.0%
Early Childhood	11	0	1	4	3	0	1	4	3	9.1%	36.4%	27.3%
Earth/Space	3	0	1	3	3	0	1	3	3	33.3%	100.0%	100.0%
English	59	1	14	30	31	9	23	39	40	39.0%	66.1%	67.8%
French	9	1	2	8	6	9	11	17	15	122.2%	188.9%	166.7%
General Elementary	299	5	16	109	98	45	61	154	143	20.4%	51.5%	47.8%
General Science	23	0	3	15	16	0	3	15	16	13.0%	65.2%	69.6%
German	4	0	3	2	2	0	3	2	2	75.0%	50.0%	50.0%
Health/Phys Educ	25	1	4	10	9	9	13	19	18	52.0%	76.0%	72.0%
Home Economics	14	0	2	7	5	0	2	7	5	14.3%	50.0%	35.7%
Industrial Arts	20	0	4	13	10	0	4	13	10	20.0%	65.0%	50.0%
Mathematics	52	1	12	28	28	9	21	37	37	40.4%	71.2%	71.2%
Music	18	2	3	7	5	18	21	25	23	116.7%	138.9%	127.8%
Other Languages	1	0	1	1	1	0	1	1	1	100.0%	100.0%	100.0%
Other Science	1	0	0	1	0	0	0	1	0	0.0%	100.0%	0.0%
Physics	5	0	2	4	4	0	2	4	4	40.0%	80.0%	80.0%
Social Studies	56	0	16	39	41	0	16	39	41	28.6%	69.6%	73.2%
Spanish	13	1	2	8	8	9	11	17	17	84.6%	130.8%	130.8%
Vocational Educ	5	0	0	1	1	0	0	1	1	0.0%	20.0%	20.0%
Vocational Tech	3	0	1	2	1	0	1	2	1	33.3%	66.7%	33.3%
MSA Total	680	13	102	325	306	117	219	442	423	32.2%	65.0%	62.2%

Source: Supply and Demand Model.

Table 5.23: Projected Hiring Needs by MSA: Williamsport and York

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Williamsport)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	2	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Art	18	1	0	7	5	9	9	16	14	50.0%	88.9%	77.8%
Biology	20	1	3	10	10	9	12	19	19	60.0%	95.0%	95.0%
Business Educ	25	1	1	11	10	9	10	20	19	40.0%	80.0%	76.0%
Chemistry	8	0	0	6	5	0	0	6	5	0.0%	75.0%	62.5%
Driver Education	4	0	2	3	3	0	2	3	3	50.0%	75.0%	75.0%
Early Childhood	14	0	-2	3	3	0	-2	3	3	(14.3%)	21.4%	21.4%
Earth/Space	6	0	0	5	2	0	0	5	2	0.0%	83.3%	33.3%
English	86	1	2	39	32	9	11	48	41	12.8%	55.8%	47.7%
French	7	0	1	4	3	0	1	4	3	14.3%	57.1%	42.9%
General Elementary	389	4	-37	117	99	36	-1	153	135	(0.3%)	39.3%	34.7%
General Science	35	0	-1	22	18	0	-1	22	18	(2.9%)	62.9%	51.4%
German	5	0	1	1	2	0	1	1	2	20.0%	20.0%	40.0%
Health/Phys Educ	48	0	-5	21	15	0	-5	21	15	(10.4%)	43.8%	31.3%
Home Economics	22	0	0	11	8	0	0	11	8	0.0%	50.0%	36.4%
Industrial Arts	33	0	1	23	19	0	1	23	19	3.0%	69.7%	57.6%
Mathematics	80	1	0	41	33	9	9	50	42	11.3%	62.5%	52.5%
Music	17	2	1	5	3	18	19	23	21	111.8%	135.3%	123.5%
Other Languages	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
Other Science	1	0	0	1	1	0	0	1	1	0.0%	100.0%	100.0%
Physics	8	0	0	7	6	0	0	7	6	0.0%	87.5%	75.0%
Social Studies	74	1	3	42	33	9	12	51	42	16.2%	68.9%	56.8%
Spanish	12	0	-1	3	4	0	-1	3	4	(8.3%)	25.0%	33.3%
Vocational Health	1	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%
MSA Total	921	12	-31	383	316	108	77	491	424	8.4%	53.1%	46.0%
(York)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	19	1	1	3	3	9	10	12	12	52.6%	63.2%	63.2%
Art	62	2	6	35	34	18	24	53	52	38.7%	85.5%	83.9%
Biology	72	2	15	30	28	18	33	48	46	45.8%	66.7%	63.9%
Business Educ	69	2	16	39	37	18	34	57	55	49.3%	82.6%	79.7%
Chemistry	33	1	5	15	12	9	14	24	21	42.4%	72.7%	63.6%
Driver Education	15	0	0	11	8	0	0	11	8	0.0%	73.3%	53.3%
Early Childhood	27	1	2	11	6	9	11	20	15	40.7%	74.1%	55.6%
Earth/Space	24	1	1	14	10	9	10	23	19	41.7%	95.8%	79.2%
English	241	5	47	128	124	45	92	173	169	38.2%	71.8%	70.1%
French	27	1	3	14	12	9	12	23	21	44.4%	85.2%	77.8%
General Elementary	1,578	22	-2	520	454	198	196	718	652	12.4%	45.5%	41.3%
General Science	70	2	13	40	38	18	31	58	56	44.3%	82.9%	80.0%
German	15	0	0	3	4	0	0	3	4	0.0%	20.0%	26.7%
Health/Phys Educ	131	4	15	68	56	36	51	104	92	38.9%	79.4%	70.2%
Home Economics	68	1	15	34	33	9	24	43	42	35.3%	63.2%	61.8%
Industrial Arts	87	2	11	46	43	18	29	64	61	33.3%	73.6%	70.1%
Mathematics	216	5	37	126	112	45	82	171	157	38.0%	79.2%	72.7%
Music	72	4	4	24	20	36	40	60	56	55.6%	83.3%	77.8%
Other Languages	7	0	1	4	5	0	1	4	5	14.3%	57.1%	71.4%
Other Science	2	0	0	1	1	0	0	1	1	0.0%	50.0%	50.0%
Physics	16	1	1	7	6	9	10	16	15	62.5%	100.0%	93.8%
Social Studies	223	3	40	139	119	27	67	166	146	30.0%	74.4%	65.5%
Spanish	46	1	7	17	16	9	16	26	25	34.8%	56.5%	54.3%
Vocational Educ	20	0	3	14	10	0	3	14	10	15.0%	70.0%	50.0%
Vocational Tech	6	0	0	2	2	0	0	2	2	0.0%	33.3%	33.3%
MSA Total	3,159	61	241	1,349	1,200	549	790	1,898	1,749	25.0%	60.1%	55.4%

Source: Supply and Demand Model.

Table 5.24: Projected Hiring Needs by MSA: Beaver and Non-MSA

Certification Area	96/7 Tchs	Quit Avg	Age 65 Retires	30 Yrs Retires	55&27 Retirees	Quits 97-05	Age 65 +Quits	30 Yrs +Quits	55&27 +Quits	Rep % Age 65	Rep % 30 Yrs	Rep % 55+27
(Beaver)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	1	0	0	1	0	0	0	1	0	0.0%	100.0%	0.0%
Art	25	1	1	15	14	9	10	24	23	40.0%	96.0%	92.0%
Biology	36	1	0	28	26	9	9	37	35	25.0%	102.8%	97.2%
Business Educat	35	1	6	17	18	9	15	26	27	42.9%	74.3%	77.1%
Chemistry	17	1	0	8	7	9	9	17	16	52.9%	100.0%	94.1%
Driver Education	5	0	0	5	4	0	0	5	4	0.0%	100.0%	80.0%
Early Childhood	7	0	-1	4	5	0	-1	4	5	(14.3%)	57.1%	71.4%
Earth/Space	10	0	1	5	4	0	1	5	4	10.0%	50.0%	40.0%
English	110	1	16	73	64	9	25	82	73	22.7%	74.5%	66.4%
French	13	0	1	7	4	0	1	7	4	7.7%	53.8%	30.8%
General Elementary	647	7	-59	226	189	63	4	289	252	0.6%	44.7%	38.9%
General Science	30	0	4	18	17	0	4	18	17	13.3%	60.0%	56.7%
German	6	0	1	3	3	0	1	3	3	16.7%	50.0%	50.0%
Health/Phys Educ	62	1	7	48	44	9	16	57	53	25.8%	91.9%	85.5%
Home Economics	26	0	2	13	8	0	2	13	8	7.7%	50.0%	30.8%
Industrial Arts	35	0	3	24	22	0	3	24	22	8.6%	68.6%	62.9%
Mathematics	102	2	9	53	47	18	27	71	65	26.5%	69.6%	63.7%
Music	29	1	2	12	10	9	11	21	19	37.9%	72.4%	65.5%
Other Languages	4	0	0	3	3	0	0	3	3	0.0%	75.0%	75.0%
Physics	7	0	2	3	3	0	2	3	3	28.6%	42.9%	42.9%
Social Studies	97	1	17	60	58	9	26	69	67	26.8%	71.1%	69.1%
Spanish	18	1	1	8	7	9	10	17	16	55.6%	94.4%	88.9%
Vocational Educat	7	0	0	3	2	0	0	3	2	0.0%	42.9%	28.6%
Vocational Tech	7	1	0	5	4	9	9	14	13	128.6%	200.0%	185.7%
MSA Total	1,340	19	13	645	566	171	184	816	737	13.7%	60.9%	55.5%
(NonMSA)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Agriculture	60	2	4	23	20	18	22	41	38	36.7%	68.3%	63.3%
Art	275	8	15	131	104	72	87	203	176	31.6%	73.8%	64.0%
Biology	341	6	25	142	131	54	79	196	185	23.2%	57.5%	54.3%
Business Educat	404	10	47	229	211	90	137	319	301	33.9%	79.0%	74.5%
Chemistry	184	6	12	78	76	54	66	132	130	35.9%	71.7%	70.7%
Driver Education	67	1	8	45	42	9	17	54	51	25.4%	80.6%	76.1%
Early Childhood	205	3	18	88	68	27	45	115	95	22.0%	56.1%	46.3%
Earth/Space	112	2	5	55	49	18	23	73	67	20.5%	65.2%	59.8%
English	1,171	21	61	567	497	189	250	756	686	21.3%	64.6%	58.6%
French	125	4	11	68	62	36	47	104	98	37.6%	83.2%	78.4%
General Elementary	6,701	64	440	3,528	2,883	576	1,016	4,104	3,459	15.2%	61.2%	51.6%
General Science	358	6	24	155	143	54	78	209	197	21.8%	58.4%	55.0%
German	61	2	6	32	34	18	24	50	52	39.3%	82.0%	85.2%
Health/Phys Educ	610	13	24	293	246	117	141	410	363	23.1%	67.2%	59.5%
Home Economics	308	6	25	133	98	54	79	187	152	25.6%	60.7%	49.4%
Industrial Arts	373	6	22	195	146	54	76	249	200	20.4%	66.8%	53.6%
Mathematics	1,093	18	36	511	439	162	198	673	601	18.1%	61.6%	55.0%
Music	349	23	21	139	104	207	228	346	311	65.3%	99.1%	89.1%
Other Languages	19	1	3	8	5	9	12	17	14	63.2%	89.5%	73.7%
Other Science	6	0	1	3	3	0	1	3	3	16.7%	50.0%	50.0%
Physics	87	3	6	35	28	27	33	62	55	37.9%	71.3%	63.2%
Social Studies	1,062	14	75	547	514	126	201	673	640	18.9%	63.4%	60.3%
Spanish	217	5	11	72	66	45	56	117	111	25.8%	53.9%	51.2%
Vocational Educat	58	2	11	33	30	18	29	51	48	50.0%	87.9%	82.8%
Vocational Health	4	0	2	1	2	0	2	1	2	50.0%	25.0%	50.0%
Vocational Tech	30	1	1	11	11	9	10	20	20	33.3%	66.7%	66.7%
MSA Total	14,353	228	920	7,159	6,045	2,052	2,972	9,211	8,097	20.7%	64.2%	56.4%

Source: Supply and Demand Model.

To alter the nature of the classroom teacher inventory, however, requires first an understanding of the institutional framework within which teachers are prepared and then selected. Chapter 6 first describes Pennsylvania's institutional framework and then compares its major elements to other states. Chapter 7 goes on to describe the empirical indicators of teacher supply **quality** and the **selectivity** of local employment decisions.

Table 5.25: Balance between Projected Teacher Needs and Historical Inventory

Gen Cert Area	Employed 1996-7 Teachers	New Cert Total: 81-97	Tot Repl Age 65 +Quits	Tot Repl 30 Yrs +Quits	Tot Repl 55+27 +Quits	Demand Supply Age 65	Demand Supply 30 Yrs	Demand Supply 55+30
Agriculture	162	141	85	130	124	60.3%	92.2%	87.9%
Art	1,532	4,811	535	1,192	1,102	11.1%	24.8%	22.9%
Biology	1,858	3,242	618	1,372	1,314	19.1%	42.3%	40.5%
Business Educat	1,926	2,889	763	1,560	1,497	26.4%	54.0%	51.8%
Chemistry	967	1,503	384	738	707	25.5%	49.1%	47.0%
Driver Education	226	939	70	198	188	7.5%	21.1%	20.0%
Early Childhood	1,385	15,250	134	418	355	0.9%	2.7%	2.3%
Earth-Space	612	733	180	485	433	24.6%	66.2%	59.1%
English	6,662	12,258	2,040	5,024	4,778	16.6%	41.0%	39.0%
French	786	1,397	294	633	613	21.0%	45.3%	43.9%
General Elementary	39,787	64,657	3,643	18,857	16,590	5.6%	29.2%	25.7%
General Science	2,027	4,218	667	1,539	1,485	15.8%	36.5%	35.2%
German	402	626	159	329	319	25.4%	52.6%	51.0%
Health-Phys Educ	3,123	8,471	982	2,480	2,224	11.6%	29.3%	26.3%
Home Economics	1,652	1,077	586	1,147	1,045	54.4%	106.5%	97.0%
Industrial Arts	1,939	1,976	587	1,498	1,348	29.7%	75.8%	68.2%
Mathematics	6,067	9,784	1,752	4,499	4,226	17.9%	46.0%	43.2%
Music	1,834	6,783	990	1,601	1,467	14.6%	23.6%	21.6%
Other Languages	178	499	85	138	132	17.0%	27.7%	26.5%
Other Science	28	48	3	15	14	6.3%	31.3%	29.2%
Physics	544	1,136	201	388	375	17.7%	34.2%	33.0%
Social Studies	5,782	12,326	1,655	4,398	4,221	13.4%	35.7%	34.2%
Spanish	1,559	2,623	490	966	943	18.7%	36.8%	36.0%
Vocational Educat	532	3,685	328	439	460	8.9%	11.9%	12.5%
Vocational Health	30	158	20	17	24	12.7%	10.8%	15.2%
Vocational Tech	226	181	71	160	144	39.2%	88.4%	79.6%
Total	82,412	161,411	17,421	50,590	46,480	10.8%	31.3%	28.8%

Source: Supply and Demand Model.

Chapter 6

Teacher Preparation and Selection in Pennsylvania

Pennsylvania's public schools are composed of 501 school districts. All but Philadelphia are politically independent — that is; they are organized separately from county and municipal governments, and have the independent authority to impose unlimited, for all intents and purposes, property, wage, and "nuisance" taxes in support of public education. Each[1] has its own elected board of school directors, and is supervised by the Pennsylvania Department of Education.

Article III, Section 14 of the Pennsylvania Constitution states:

> The General Assembly shall provide for maintenance and support of a thorough and efficient system of public schools to serve the needs of the Commonwealth.

As a matter of law, the General Assembly is the constitutionally responsible school board of the state, and effects its obligations through various statutes and institutions:

1. The State Board of Education (as of 1965);
2. The State Vocational Board (composed of the members of the State Board of Education);
3. The Pennsylvania Department of Education (an Executive Branch Agency);
4. 501 school districts (nine elected school board members (in all but Philadelphia, where they are appointed by the Mayor));
5. The 29 Intermediate Units[2]; and
6. The State System of Higher Education (as of 1982).

While public school districts (composed of elected school boards and appointed superintendents) are often described as "local government", they are in fact instrumentalities of the General Assembly. Elected school board members are state officials whose authority is composed only of those powers granted by the State , and they must carry out their State-directed responsibilities on behalf of the State. Unlike their municipal and county counterparts, school board members do not receive salaries.

[1] While Philadelphia's School Board is separate from the Philadelphia City Council, ultimate budgetary decisions are made by the City Council, and the members of the Philadelphia school board are appointed by the Mayor of Philadelphia.

[2] Philadelphia and Pittsburgh's intermediate units are coterminous with their school district boundaries.

6.1 Institutional Framework for Teacher Preparation

To be employed as a public school teacher in Pennsylvania, the applicant must:

1. Be of good moral character;
2. Be mentally and physically qualified to perform the duties of a teacher;
3. Be 18 years of age; and
4. Have earned a baccalaureate degree as a general education requirement in a program of teacher preparation approved by the Pennsylvania Department of Education, and recommended to the Department of Education for certification by the program.[3]

Also, under ¶49.18 a) of the School Code and counterpart Teacher Certification Regulations, the Secretary of Education was required, as of May 9, 1985, to "institute a testing program for candidates for certification designed to assess their basic skills, general knowledge, professional knowledge, and knowledge of the subjects in which they seek certification."

As a practical matter, those interested in pursuing a career in public school teaching must apply to and be admitted to a college or university which has an approved program of teacher preparation. Such programs are approved by area of certification, e.g. elementary education, various types of special education, or areas of specialization at the secondary level (social studies, mathematics, etc.). Satisfactory completion of the program's stipulated course requirements, coupled with a recommendation by the certifying officer at the teacher preparation institution, and passing scores on state-established standardized teacher examinations enables one to apply for teacher certification. In turn, such certification enables the applicant to be legally employed by a public school district.

6.2 SAT Scores of High School Seniors Interested in Education Careers

While Pennsylvania, unlike other states, does not require standardized tests for admissions to teacher preparation programs, ETS provided to this project the most recent information on the intended college majors (including education) of Pennsylvania high school seniors. Table 6.1 displays the mean verbal and math SAT scores for Pennsylvania and the US from the Fall, 1996 intended college majors of Pennsylvania high school seniors. Several things are evident. First, Pennsylvania's SAT scores are lower than their counterpart US scores; this has been explained by some observers as due to the large number of Pennsylvania high school students taking the examinations. Second, Pennsylvania's high school seniors intending to become education majors score substantially below their Pennsylvania counterparts interested in pursuing academic majors. For example, the mean math SAT score of an intended education major was 471 compared to 614 for intended math majors, or a difference of 30%. A 471 is well below the median or 50th percentile, while a 612 is well above the 75th percentile. 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% difference. The combined math and verbal score of those interested in becoming teachers was at the 38'th percentile of all those in Pennsylvania who took the SAT test.

[3]See PDE, Bureau of Teacher Preparation and Certification(1985), p. 7.

Ten years ago, Pennsylvania's SAT scores of intended education majors were lower: 410 verbal and 430 math, or at the 25th percentile of the overall distribution. There is national evidence that those who get hired and remain in teaching have SAT scores at the 25th percentile of all employed college graduates.[4] If the academic achievement level of classroom teachers hovers at the 25th percentile, it is easy to understand why international comparisons of US 14 year olds compares unfavorably with their counterparts around the world; having classroom teachers with below average achievement levels themselves can dilute the achievement and motivation of students.

Table 6.1: Fall 1996 Pa. SAT Scores of High School Seniors Interested in Education Careers

	Mean SAT Verbal	Mean SAT Math
US Education	487	477
PA Education	483	471
US Math	552	626
PA Math	542	614
US Biological Sci	546	545
PA Biological Sci	540	528
US Phy Sciences	575	595
PA Phy Sciences	562	578
US Lang and Lit	605	545
PA Lang and Lit	595	527
US Business	482	500
PA Business	479	488

Source: ETS communication to author.

6.3 National Teacher Examination (NTE) Tests and Passing Levels

Beginning in 1987, Pennsylvania replaced its own teacher preparation tests with ETS examinations. The National Teacher Exam and its successor, Praxis, were designed by ETS to measure competency in core basic skills (reading, writing, and mathematics), core education knowledge (general, professional, and communication), and content knowledge in various specialty areas.

States vary widely in their use of ETS testing products. For example, as of January, 1997, ETS core battery tests in reading and writing were used by: Arizona, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Maine, Minnesota, Mississippi, Montana, Nebraska, Nevada, North Carolina, Ohio Council for Academic Excellence in Schools, Oklahoma, Oregon, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin, and the Department of Defense Dependent's Schools.[5] However, only Arizona, Connecticut, Florida, Kentucky, Indiana, Louisiana, Maryland,

[4] See Hanushek and Pace (1995).

[5] New York, California, Illinois, and other states use comparable testing systems sold by National Evaluation Systems.

Massachusetts, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, and Virginia use the ETS mathematics examination; Arizona, DC, Georgia, Hawaii, Kentucky, Nevada, New Jersey, North Carolina, Oregon, Tennessee, and West Virginia used the mathematics content knowledge test; California, DC, Georgia, Kentucky, Nevada, and Oregon used the basic mathematics test of proofs, models, and problems; only California and Oregon used the second mathematics test of proofs, models, and problems. It seems likely that states which test their mathematics teachers more widely demand more mathematics knowledge of their teachers than states which do not test as widely.

The current versions of the various exams do not purport to measure teacher classroom effectiveness, usually described as pedagogy, although the core battery test of education knowledge tests for understanding of pedagogy as contrasted with actual effective performance. Also, the NTE/Praxis is not validated on the teacher's students' performance or academic achievement, rather it focuses on developing a pool of competent teachers. Minimum passing scores are left to the states to determine through periodic panels of experienced teachers who review the most recent examinations, and set passing thresholds based on their peer evaluation.

On the other hand, common sense suggests that the greater the content knowledge competency of a classroom teacher, the stronger the likelihood that the teacher's students will have an opportunity to learn that particular subject matter. That is, content knowledge is a necessary but not sufficient condition for being an effective teacher. This would seem especially important at the middle school and secondary levels.

Prospective teachers in Pennsylvania must pass ETS's NTE core battery tests in Communication Skills, General Knowledge, and Principles of Learning and Teaching, and the appropriate ETS subject matter tests.[6] Passing scores are determined by the Department through panels of experienced teachers, and have been implemented over time.

Table 6.2 shows Pennsylvania's NTE passing scores (col 1), the 25th percentile score (col 2) from analysis of the universe of Pennsylvania NTE test results, the actual test range (col 3), the relative, weighted number of correct answers of average difficulty needed to pass (col 4), and the effective date the passing score was set (col 5).

The calculation of col 4 requires further explanation. Since the test range is centered above zero, typically from 250 to 990, and guessing is allowed without penalty on these examinations, there really are fewer points available to be earned than the top score of, say, 990. If we subtract the lower bound of the range, we note that 740 points are available to be earned since 250 points are given simply for taking the test. If we subtract 250 from the median score and from 990, we can calculate an indicator of what fraction of the test questions correctly answered the median score represents. However, because some questions and answers are weighted more heavily than others due to difficulty level, simply getting another question correct does not directly imply a direct percentage score. On the other hand, the resultant "Weighted Percent Correct to Pass" gives an indication of what a passing score represents for questions of average difficulty. [7]

The fact that the passing scores or cut scores are set quite low necessarily implies very high passing rates for those who take the NTE examination. For Pennsylvania they are, with the exception of Social Studies and the most recent science examinations, on the order of 90% or higher.[8] Low passing scores, coupled with vague[9] and loosely applied teacher preparation program

[6]The ETS testing system has been revised and the new system, Praxis, is being phased in.

[7]That is, one way to think about this calculation is to view it as the fraction of questions, of average difficulty, which must be answered correctly to pass the test.

[8]See Strauss(1994) for a discussion of these high pass rates.

[9]See Chapter 6.

approval standards, imply that virtually anyone can become certified to teach in Pennsylvania if they are willing to spend a number of years taking teacher preparation courses and can achieve the cut scores. This was especially the case in physics, chemistry, and earth and space science during 1987-96 when there was no cut score whatsoever promulgated by the Pa. Department of Education, and remains the case for General Science which still does not have a cut score.[10]

[10]There is anecdotal evidence that recent leniency in the program approval process has resulted in some educational institutions developing weekend teacher preparation programs and actively marketing their availability on radio and television.

Table 6.2: Pennsylvania Teacher Examination Passing Scores

Test	Passing Score	25th %	Test Range	WT % Correct to Pass	Effective Date
	(1)	(2)	(3)	(4)	(5)
Core Battery: Reading	309	324	300-335	25.7%	1997
Core Battery: Writing	311	320	300-335	25.7%	1997
Communication Skills	646	654	250-990	51.4%	1990
General Knowledge	644	650	250-990	51.1%	1990
Professional Knowledge	643	655	250-990	51.0%	1990
Art Education	540	570	250-990	37.7%	1990
Biology	580	600	250-990	42.9%	1990
Chemistry	500	490	250-990	32.5%	1997
Earth Space	570	550	250-990	41.5%	1997
English, PA Test	333	NA	300-390	36.7%	1988
English NTE	490	650	250-990	31.1%	1990
English NTE Praxis	153	155	100-200	53.0%	1994
Early Childhood	530	600	250-990	36.4%	1990
Elementary Education	570	600	250-990	42.8%	1988
Health and Phys Ed PA Test	78	NA	0-145	53.8%	1988
Health and Phys Ed NTE	500	650	250-990	32.5%	1990
Mathematics	540	580	250-990	37.7%	1989
Music	560	570	250-990	40.3%	1989
Ment-Phys Hand PA Test	370	NA	300-390	77.7%	1989
Ment-Phys Handicapped NTE	570	NA	250-990	41.6%	1990
Physics	440	480	250-990	24.7%	1997
Social Studies	580	560	250-990	42.8%	1989

Source: PDE, Bureau of Teacher Preparation, ETS.

More recently, ETS has replaced the National Teacher Exam with its Praxis series examinations which are both more extensive in testing particular speciality areas, and also centered quite differently in numerical terms. Table 6.3 displays the more complete set of tests administered by ETS, and sold to any of the states which were examined in more detail (with the exception of New York) in Chapter 4. Some of the tests continue to range in score between 250 and 990, while others range from 100-200. (See columns (2) and (3) of Table 6.3.)

Also displayed in Table 6.3 are the actual national distributions of scores from August, 1997. Column (4) indicates what the 25'th percentile score was for each test; Column (5) indicates what the median or 50'th percentile score was for each test; and, Column (6) displays what the 75'th percentile score was for each test. Finally, Column (7) shows what the weighted percentage correct was for the test score at the 25'th percentile. Frequently the percent of answers correct is less than half for test scores at the 25'th percentile.

Table 6.4 displays the passing scores as of March, 1998 for each state. Very few states' set passing scores beyond the 25th percentile, consistent with the passing scores observed for NTE tests discussed earlier.

Table 6.3: 1998 Praxis Test Ranges and 1997 Actual National Score Distributions

Prax Test	Test Range Min	Test Range Max	Actual Score Distribution 25'th%	Actual Score Distribution Median	Actual Score Distribution 75'th%	Wtd % right @25'th%
	(2)	(3)	(4)	(5)	(6)	(7)
Agriculture (PA)	250	990	600	660	720	47.3%
Art Content	100	200	161	173	183	61.0%
Art Criticism	100	200	135	150	160	35.0%
Art Education	250	990	570	620	680	43.2%
Art Making	100	200	168	168	177	68.0%
Audiology	250	990	610	640	660	48.6%
Biology	250	990	610	690	780	48.6%
Bio/General Science	250	990	600	650	700	47.3%
Bio/Essay	100	200	141	151	159	41.0%
Bio Knowledge 1	100	200	168	169	179	68.0%
Bio Knowledge 2	100	200	135	148	160	35.0%
Bio Knowledge (0235)	100	200	169	167	177	69.0%
Business	250	990	600	640	680	47.3%
CBT Math	300	335	319	324	329	54.3%
CBT Reading	300	335	324	328	331	68.6%
CBT Writing	300	335	320	323	326	57.1%
Chemistry	250	900	490	560	630	36.9%
Chem/Essay	100	200	145	160	165	45.0%
Chem knowledge (0245)	100	200	136	162	167	36.0%
Chem,Phys,GenSci	250	990	530	580	650	37.8%
CB: Communications	600	695	654	661	668	56.8%
CB: GenKnowledge	600	695	650	657	664	52.6%
CB: ProfKnowledge	600	695	655	663	670	57.9%
Communication (PA)	250	990	650	740	780	54.1%
Cooperative Ed.	250	990	780	820	870	71.6%
Data Processing	100	200	161	171	179	61.0%
Early Child Ed.	250	990	600	650	700	47.3%
EarthSci Knowledge	100	200	147	162	180	47.0%
Earth/Space	250	990	550	630	700	40.5%
Ed in Elementary	250	990	600	640	670	47.3%
Ed: Deaf/Hard of Hear	100	200	161	171	179	61.0%
Ed: Mental Retardatio	250	990	560	630	670	41.9%
Ed Leadership: Admini	250	990	620	880	730	50.0%
Elem Ed: Content Area	100	200	151	156	164	51.0%
Elem Ed: Curricula, I	100	200	170	181	189	70.0%
Elem Ed: Curricula, I	100	200	142	151	158	42.0%
Eng/Knowledge	100	200	167	178	188	67.0%
English Essays	100	200	155	160	170	55.0%
English Literature	250	990	660	800	850	55.4%
Environmental Ed	250	990	640	690	760	52.7%
Foreign Lang. Ped.	100	200	163	173	181	63.0%
French	250	990	560	630	690	41.9%
French Cont. Know	100	200	169	183	192	69.0%
French Cult. Analysis	100	200	161	178	188	61.0%
French (Speaking)	100	200	170	182	193	70.0%
Gen Science	250	990	560	650	730	41.9%
GenSci/Essay	100	200	135	145	160	35.0%
GenSci (0435)	100	200	160	170	183	60.0%
German(Listening)	250	990	530	620	690	37.8%
German Knowledge	100	200	177	191	197	77.0%
Health/Phys. Ed.	250	990	560	620	670	41.9%
Health Ed.	250	990	650	710	760	54.1%
Home Economics	250	990	610	660	700	48.6%
Intro.to Teaching Reading	250	990	620	670	700	50.0%
Italian	250	990	770	830	860	70.3%
Latin	250	990	730	800	860	64.9%
Library Media Spec	250	990	630	670	710	51.4%
Marketing(PA)	100	200	165	173	180	65.0%
Marketing Ed	250	990	650	710	760	54.1%
Mathematics	250	990	560	610	670	41.9%
Mathematics Knowledge	100	200	121	139	153	21.0%
Mathematics 1	100	200	144	163	179	44.0%
Mathematics 2	100	200	131	144	162	31.0%
MSAT Content	100	200	155	163	172	55.0%
MSAT Area Exercises	100	200	152	159	166	52.0%
Music Education	250	990	570	620	680	43.2%
Music Analysis	100	200	151	167	178	51.0%
Music Concept Proc.	100	200	140	155	165	40.0%
Music Knowledge	100	200	155	165	174	55.0%
Office Tech (PA)	100	200	158	166	171	58.0%
Physical Education	250	990	590	630	670	45.9%
Physical Ed: Content	100	200	147	154	161	47.0%
Phys Ed: Movement Ana	100	200	149	156	164	49.0%

[continued on next page]

Prax Test	Test Range Min	Max	Actual Score Distribution 25'th%	Median	75'th%	Wtd % right @25'th%
Phys Ed: Movement Vid	100	200	155	165	175	55.0%
Physics	250	990	480	550	640	31.1%
Physics/Essay	100	200	150	160	170	50.0%
Physics (0265) Conten	100	200	153	150	173	53.0%
Prin Learn Teach K-6	100	200	169	175	183	69.0%
Prin Learn Teach 5-9	100	200	166	175	183	66.0%
Prin Learn Teach 7-12	100	200	171	179	185	71.0%
Pre-Prof Math	150	190	173	179	184	57.5%
Pre-Prof Reading	150	190	175	179	182	62.5%
Pre-Prof Writing	150	190	173	175	178	57.5%
Reading Specialist	250	990	570	620	660	43.2%
Safety/Driver Ed.	250	990	520	560	610	36.5%
School Guidance	250	990	620	670	710	50.0%
School Psychologists	250	990	650	700	750	54.1%
Secretarial (PA)	100	200	156	162	172	56.0%
Social Studies	250	990	560	610	660	41.9%
Social Studies/ Essay	100	200	145	155	165	45.0%
Social Studies Knowle	100	200	156	169	180	56.0%
Social Studies Interp	100	200	159	167	174	59.0%
Spanish	250	990	520	590	660	36.5%
Spanish Content	100	200	163	176	189	63.0%
Spanish Analysis	100	200	160	173	182	60.0%
Spanish Speaking	100	200	163	178	193	63.0%
Special Education	250	990	570	630	680	43.2%
Special Education: Ap	100	200	147	156	181	47.0%
Special Education: Kn	100	200	155	162	174	55.0%
Spec Ed: Mental Retar	100	200	143	151	165	43.0%
Speech Communic.	250	990	610	670	720	48.6%
Speech Pathology	250	990	630	670	710	51.4%
Teach Eng. as 2nd Lan	250	990	620	710	780	50.0%
Teaching Speech to L	250	990	610	690	740	48.6%
Teach - Emotional	250	990	620	680	740	50.0%
Teach - Visual	250	990	700	760	790	60.8%
Teaching Lear Dis	250	990	610	670	730	48.6%
Technology Educ.	250	990	620	670	700	50.0%
Vocational Gen Knowle	250	990	580	680	750	44.6%

Source: ETS FTP Site, August, 1997 Praxis Booklet

Table 6.4: Passing Praxis Scores in Selected States, as of February, 1998

	25'th%	% Wtd Right	AZ	CA	CT	NY	OH	PA	VA	WI
Praxis Test	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Agriculture (PA)	600	47.3%			470					
Art Content	161	61.0%			157					
Art Criticism	135	35.0%		160	130					
Art Education	570	43.2%	450				510	540	500	
Art Making	168	68.0%		171	148					
Audiology	610	48.6%					490			
Biology	610	48.6%								
Bio/General Science	600	47.3%	540				480	NA	580	
Bio/Essay	141	41.0%		157						
Bio Knowledge 1	168	68.0%						144		
Bio Knowledge 2	135	35.0%						135		
Bio Knowledge (0235)	169	69.0%			152					
Business	600	47.3%	550		620		540	NA	550	
CBT Math	319	54.3%	314		319				323	318
CBT Reading	324	68.6%	316		324			309	326	322
CBT Writing	320	57.1%	316		318			311	324	320
Chemistry	490	36.9%					430	500	NA	
Chem/Essay	145	45.0%		155	140					
Chem knowledge (0245)	136	36.0%			151					
Chem,Phys,GenSci	530	37.8%	520				520	NA	560	
CB: Communications	654	56.8%				650		646		
CB: GenKnowledge	650	52.6%				649	642	644		
CB: ProfKnowledge	655	57.9%	642			646	642	643		
Communication (PA)	650	54.1%						NA		
Cooperative Ed.	780	71.6%						NA		
Data Processing	161	61.0%						NA		
Early Child Ed.	600	47.3%					480	530	490	
EarthSci Knowledge	147	47.0%			157					
Earth/Space	550	40.5%						570	NA	
Ed in Elementary	600	47.3%	500				510	570	520	
Ed: Deaf/Hard of Hearing	161	61.0%						NA		
Ed: Mental Retardation	560	41.9%					490	570	520	
Ed Leadership: Administratio	620	50.0%					500			
Elem Ed: Content Area Ex.	151	51.0%			148					
Elem Ed: Curricula, Instruct	170	70.0%						164		
Elem Ed: Curricula, Instruct	142	42.0%			163					
Eng/Knowledge	167	67.0%	148		172			153		
English Essays	155	55.0%		160	160					
English Literature	660	55.4%							520	
Environmental Ed	640	52.7%						NA		
Foreign Lang. Ped.	163	63.0%						NA		
French	560	41.9%					520		570	
French Cont. Know	169	69.0%			165					
French Cult. Analysis	161	61.0%	490	171			520			

	25'th%	% Wtd Right	AZ	CA	CT	NY	OH	PA	VA	WI
French (Speaking)	170	70.0%		172	163					
Gen Science	560	41.9%	149				370	NA		
GenSci/Essay	135	35.0%		150	145					
GenSci (0435)	160	60.0%			157					
German(Listening)	530	37.8%			580				560	
German Knowledge	177	77.0%			162					
Health/Phys. Ed.	560	41.9%	520				480	500		
Health Ed.	650	54.1%			680		540	500	NA	
Home Economics	610	48.6%	520		630			NA	570	
Intro.to Teaching Reading	620	50.0%	510	680			540			
Italian	770	70.3%			670					
Latin	730	64.9%			770					
Library Media Spec	630	51.4%	540				520	NA		
Marketing(PA)	165	65.0%						NA		
Marketing Ed	650	54.1%	520				440	550	NA	
Mathematics	560	41.9%			590		530	540	580	
Mathematics Knowledge	121	21.0%	136		141			127		
Mathematics 1	144	44.0%		170						
Mathematics 2	131	31.0%		159						
MSAT Content	155	55.0%		156						
MSAT Area Exercises	152	52.0%		155						
Music Education	570	43.2%	510		600			560	510	
Music Analysis	151	51.0%		169						
Music Concept Proc.	140	40.0%		165	150					
Music Knowledge	155	55.0%			153					
Office Tech (PA)	158	58.0%						NA		
Physical Education	590	45.9%	540				540		560	
Physical Ed: Content	147	47.0%			154					
Phys Ed: Movement Analysis	149	49.0%		158	154					
Phys Ed: Movement Video Eval	155	55.0%		170						
Physics	480	31.1%						440	NA	
Physics/Essay	150	50.0%		160	135					
Physics (0265) Content Know	153	53.0%			141					
Prin Learn Teach K-6	169	69.0%		164				162		
Prin Learn Teach 5-9	166	66.0%			163					
Prin Learn Teach 7-12	171	71.0%		167				159		
Pre-Prof Math	173	57.5%	169						176	173
Pre-Prof Reading	175	62.5%	170						178	175
Pre-Prof Writing	173	57.5%	171						178	174
Reading Specialist	570	43.2%	550					NA		
Safety/Driver Ed.	520	36.5%						NA		
School Guidance	620	50.0%					510			
School Psychologists	650	54.1%					350			
Secretarial (PA)	156	56.0%						NA		
Social Studies	560	41.9%	500				520	580	540	
Social Studies/ Essays	145	45.0%		160						

	25'th%	% Wtd Right	AZ	CA	CT	NY	OH	PA	VA	WI
Social Studies Knowledge	156	56.0%	134		162			157		
Social Studies Interp	159	59.0%		169						
Spanish	520	36.5%	470				520		540	
Spanish Content	163	63.0%			170					
Spanish Analysis	160	60.0%		171						
Spanish Speaking	163	63.0%		172	163					
Special Education	570	43.2%	510		590					
Special Education: Applicati	147	47.0%			150					
Special Education: Knowledge	155	55.0%			155					
Spec Ed: Mental Retardation	143	43.0%								
Speech Communic.	610	48.6%	550						470	
Speech Pathology	630	51.4%	570				500			
Teach Eng. as 2nd Lang	620	50.0%					420			
Teaching Speech to Lang. Im	610	48.6%						NA		
Teach - Emotional	620	50.0%					510	570	NA	
Teach - Visual	700	60.8%	480				580	620		
Teaching Lear Dis	610	48.6%					390		NA	
Technology Educ.	620	50.0%	550		640			NA	580	
Vocational Gen Knowledge	580	44.6%						NA		

Source: ETS FTP Site, August, 1997 Praxis Booklet

Blank indicates that the test is not used.
NA indicates that the the test is used, but a passing score has not been set.

If we compare these passing scores to tests of knowledge in other professions, we find that the hurdles to become an accountant or lawyer are much higher than that facing a prospective classroom teacher.

In accounting, 20,213 candidates took the Spring, 1994 CPA examination; standards are set by each state CPA society. Nationally, only 17.6% passed all portions of the exam while 50.4% failed all portions of the examination. In Pennsylvania, 5.2% passed all portions of the 1994 examination, and 62% failed all portions. Overall, 32.0% nationally and 32% in Pennsylvania passed some portion of the overall examination.[11]

In law, 69.8% of those who took the State bar examinations in the Winter of 1995 passed; in Pennsylvania, the comparable passing rate was 48%.[12] By contrast, the passing rates in Pennsylvania and most other states on teacher certification tests are 90% or higher.

6.4 Example of Pa. Program Approval Standard: Mathematics Program

The PDE regulations governing approved programs of instruction are both extensive and quite vague. As an example, consider those governing the approval of mathematics preparation. They are quoted in their entirety below to acquaint the reader with the nature of the state standards:[13]

[11]Source: National Association of Schools of Business Administration, *Statistical Information Service*, May 1994 results.

[12]The BAR/BRI Group, http://www.barbri.com/

[13]These mathematics standards are found on p. 50 of PDE (1985).

Standard I

The program shall require studies of the mathematical concepts and logic in statistics and probability, algebraic structures, geometry, linear algebra, calculus, trigonometry, number theory, and finite mathematics.

Standard II

The program shall require studies of the historical and cultural significance of mathematics.

Standard III

The program shall require studies of and experiences in the development and application of mathematical models in other disciplines such as physics, biology, sociology, psychology, and economics.

Standard IV

The program shall require studies of an experiences in the use of the computer, fundamental programming, and educational software development and use.

Standard V

The program shall require studies of the mathematical content included in secondary, junior high school, and middle school curricula.

Standard VI

The program shall require studies of and experience in adapting mathematical instruction to the needs and abilities of each student including the needs of the exceptional student.

Standard VII

The program shall require professional studies distributed over the areas defined in General Standard XIV. The student teaching experience should require the candidate to demonstrate competency in these areas.

No minimum number of courses in algebra, calculus, matrix algebra, etc. are stipulated, nor are the particular topics within any of the areas of mathematics defined. In an area as well defined as computer programming, the student is not required to take one of several popular languages such as Pascal or C++, but merely to have been involved in studies and experiences in the use of the computer.

6.5 School District Teacher Assignment vs. Teacher Certification

The teaching certificate enables the prospective teacher to be assigned to and teach those classes for which the certification is the approved preparation by the Pennsylvania Department of Education.[14] Each school district annually provides to the Department of Education a list of its professional personnel, and their teacher assignments, and attests that the assignments have been made consistent with PDE regulations governing the linkage between teacher preparation, certification, and actual instruction. Thus, to teach various mathematics classes in grades 7-12, the classroom teacher must hold a mathematics teaching certificate from an approved program of appropriate mathematics preparation.

Irrespective of whether or not one finds the definition of skills necessary to teach in a particular specialty area, a question arises about the extent to which teachers are assigned to areas they

[14]See PDE, Bureau of Teacher Preparation and Certification, *PDE Approved Certificated Assignments*, (Harrisburg, Pa.: June, 1982).

are certified to teach in. Because the project has available both information on major and minor teaching assignment from the Professional Personnel form filled out annually by the school district superintendent as well as the Department's file on each teacher's certification[s], we can examine the extent to which teachers are teaching with state-defined certifications.

Table 6.5 shows for school year 1995/6 the results of the machine checking of assignment and certification. For the very large teaching areas such as Elementary (Code 2810 with 39,261 classroom teachers) and English (Code 3200 with 6,449 classroom teachers), the misassignment of teachers statewide is relative modest: the rates are 1.2% for Elementary Education and 2.5% for English.[15] Mathematics (Code 6800 with 5,993 classroom teachers) had a misassignment rate of 2.4%, while Social Studies (Code 8875 with 4,325 classroom teachers) had a misassignment rate of 7.1%.

Smaller, more specialized teaching areas displayed much higher rates of misassignment; Various business teaching assignments also display large fractions of teachers without the proper certification. Whether or not these discrepancies constitute serious educational issues (teachers unable to competently instruct in these areas) can not be ascertained from simply matching two databases.

A similar analysis was performed for teachers' stated 1st minor teaching assignment viz a viz their credentials. This comparison shows greater disparity than the comparison of major assignment and certification. Teachers assigned to mathematics, as a minor teaching assignment, did not have proper credentials in 14% of the cases. (See Table 6.6.) Twenty of 59 general science teachers did not have certification to teach general science.

[15] This check of correspondence was made across all certifications listed by each teacher.

Table 6.5: 1995/6 State-wide Major Teaching Assignments: (% Properly Certificated)

Major 1995/6 Classroom Assignment	Assignments Inconsistent with Certification	Assignments Consistent with Certification	% Inconsistent	% Consistent
Assgn:1176:Gift Clss, Tut:Res, All	100	47	68.0%	32.0%
Assgn:1177:Gift Clss, Tut:Res, Sec	106	66	61.6%	38.4%
Assgn:1180:Alternative Ed Program	88	14	86.3%	13.7%
Assgn:1200:Agriculture	1	163	0.6%	99.4%
Assgn:1401 Art, Elem	3	775	0.4%	99.6%
Assgn:1402 Art, Sec	4	825	0.5%	99.5%
Assgn:1405 Art, K-12	5	1,355	0.4%	99.6%
Assgn:1601:Other Business Subjects	4	347	1.1%	98.9%
Assgn:1610:Accounting	17	406	4.0%	96.0%
Assgn:1625:Data Processing	49	70	41.2%	58.8%
Assgn:1640:Marketing Sales	8	20	28.6%	71.4%
Assgn:1655:Secretarial	28	281	9.1%	90.9%
Assgn:1660:Typewriting	37	526	6.6%	93.4%
Assgn:1665:Distributive Education	17	27	38.6%	61.4%
Assgn:2361:Cooperative Education	4	96	4.0%	96.0%
Assgn:2600:Vocational Instruction	24	0	100%	0.0%
Assgn:2810:Elem	457	38,804	1.2%	98.8%
Assgn:2811:Gifted Classes, Elem	40	403	9.0%	91.0%
Assgn:2840:Early Childhood	437	981	30.8%	69.2%
Assgn:3200:English:Communic	163	6,286	2.5%	97.5%
Assgn:3220:Drama	2	27	6.9%	93.1%
Assgn:3240:Journalism	0	12	0.0%	100%
Assgn:3250:Speech	41	31	56.9%	43.1%
Assgn:4005:Arabic	1	0	100%	0.0%
Assgn:4020:Hebrew	0	4	0.0%	100%
Assgn:4025:Korean	0	1	0.0%	100%
Assgn:4030:Latin	0	148	0.0%	100%
Assgn:4405:Chinese	0	2	0.0%	100%
Assgn:4410:French	5	817	0.6%	99.4%
Assgn:4411:French, Elem	0	2	0.0%	100%
Assgn:4420:German	2	440	0.5%	99.5%
Assgn:4421:German, Elem	0	1	0.0%	100%
Assgn:4430:Italian	0	20	0.0%	100%
Assgn:4440:Japanese	1	12	7.7%	92.3%
Assgn:4480:Russian	2	7	22.2%	77.8%
Assgn:4490:Spanish	5	1,611	0.3%	99.7%
Assgn:4491:Spanish, Elem	0	6	0.0%	100%
Assgn:4801:Health & Phys Ed, Elem	4	830	0.5%	99.5%
Assgn:4802:Health & Phys Ed, Sec	10	1,627	0.6%	99.4%
Assgn:4805:Health & Phys Ed, K-12	15	2,457	0.6%	99.4%
Assgn:4810:Health	2	187	1.1%	98.9%
Assgn:4817:Phys Ed	3	453	0.7%	99.3%
Assgn:4820:Environmental Ed	8	12	40.0%	60.0%
Assgn:5210:Driver Ed	35	178	16.4%	83.6%
Assgn:5400:Safety Ed	3	8	27.3%	72.7%
Assgn:5605:Home Economics	15	1,691	0.9%	99.1%
Assgn:6010:Ind Arts, Drawing	11	121	8.3%	91.7%
Assgn:6014:Ind Arts, Art Crafts	3	1	75.0%	25.0%
Assgn:6020:Ind Arts, Elect	4	34	10.5%	89.5%
Assgn:6025:Ind Arts, Auto	3	13	18.8%	81.3%
Assgn:6030:Ind Arts, Graphic Arts	12	95	11.2%	88.8%
Assgn:6035:Ind Arts, Ceramics	0	1	0.0%	100%
Assgn:6040:Ind Arts, Metal	14	112	11.1%	88.9%
Assgn:6045:Ind Arts, Plastics	0	1	0.0%	100%
Assgn:6050:Ind Arts, Wood	30	197	13.2%	86.8%
Assgn:6060:Ind Arts, Printing	1	11	8.3%	91.7%
Assgn:6800:Mathematics	141	5,852	2.4%	97.6%
Assgn:7201:Music, Elem	1	1,093	0.1%	99.9%
Assgn:7202:Music, Sec	5	769	0.6%	99.4%
Assgn:7205:Music, K-12	9	2,068	0.4%	99.6%
Assgn:8400:Arboretum, Aviary, Green	0	1	0.0%	100%
Assgn:8401:Planetarium, Metero Stat	2	11	15.4%	84.6%
Assgn:8405:Biology	26	1,675	1.5%	98.5%
Assgn:8420:Chemistry	12	936	1.3%	98.7%
Assgn:8440:Earth & Space Science	58	319	15.4%	84.6%
Assgn:8450:General Science, Interm	16	1,711	0.9%	99.1%
Assgn:8470:Physics	7	523	1.3%	98.7%
Assgn:8490:Science, Interdisc Advan	23	3	88.5%	11.5%
Assgn:8805:Anthropology	0	3	0.0%	100%
Assgn:8830:Economics	3	64	4.5%	95.5%
Assgn:8840:Geography	9	173	4.9%	95.1%
Assgn:8842:Government	7	94	6.9%	93.1%
Assgn:8845:History	6	888	0.7%	99.3%

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Major 1995/6 Classroom Assignment	Assignments Inconsistent with Certification	Assignments Consistent with Certification	% Inconsistent	% Consistent
Assgn:8860:Psychology, Social:Behav	27	30	47.4%	52.6%
Assgn:8861:Psychology, Interdis Sci	1	0	100%	0.0%
Assgn:8867:ROTC Instructor	1	11	8.3%	91.7%
Assgn:8870:Philosophy	0	1	0.0%	100%
Assgn:8875:Social Studies	307	4,018	7.1%	92.9%
Assgn:8880:Sociology	3	31	8.8%	91.2%
Assgn:9205:Hearing Impaired	18	73	19.8%	80.2%
Assgn:9235:Mentally:Phys,Hand,Learn	71	9,489	0.7%	99.3%
Assgn:9270:Speech Correction	103	716	12.6%	87.4%
Assgn:9290:Visually Impaired	2	42	4.5%	95.5%
Total	2,682	93,256	2.8%	97.2%

Source: Analysis of Certification and Prof. Personnel files.

Table 6.6: 1995/6 State-wide Minor Teaching Assignments: (% Properly Certificated)

Minor 1995/6 Classroom Assignment	Assignments Inconsistent with Certification	Assignments Consistent with Certification	% Inconsistent	% Consistent
Assgn:1100:Elem Princ	0	16	0.0%	100%
Assgn:1101:Asst or Vice Elem Princ	0	5	0.0%	100%
Assgn:1105:Sec Princ	0	5	0.0%	100%
Assgn:1106:Asst or Vice Sec Princ	0	4	0.0%	100%
Assgn:1112:Asst/Vice Middle Sch Pri	0	2	0.0%	100%
Assgn:1130:Director of Athletics	32	22	59.3%	40.7%
Assgn:1160:IU Executive Director	1	0	100%	0.0%
Assgn:1170:IU Program Specialist	1	1	50.0%	50.0%
Assgn:1175:Sch Program Specialist	11	157	6.5%	93.5%
Assgn:1176:Gift Clss, Tut:Res, All	24	12	66.7%	33.3%
Assgn:1177:Gift Clss, Tut:Res, Sec	66	21	75.9%	24.1%
Assgn:1178:Superv, Gifted Programs	1	2	33.3%	66.7%
Assgn:1180:Alternative Ed Program	21	1	95.5%	4.5%
Assgn:1200:Agriculture	1	9	10.0%	90.0%
Assgn:1215:Supervisor, Agriculture	1	1	50.0%	50.0%
Assgn:1401 Art, Elem	0	17	0.0%	100%
Assgn:1402 Art, Sec	0	16	0.0%	100%
Assgn:1405 Art, K-12	0	8	0.0%	100%
Assgn:1413 Supervisor, Art, Sec	0	1	0.0%	100%
Assgn:1415 Supervisor, Art, K-12	3	6	33.3%	66.7%
Assgn:1601:Other Business Subjects	7	371	1.9%	98.1%
Assgn:1610:Accounting	13	242	5.1%	94.9%
Assgn:1615:Supervisor, Business Ed	6	4	60.0%	40.0%
Assgn:1625:Data Processing	40	65	38.1%	61.9%
Assgn:1640:Marketing Sales	12	39	23.5%	76.5%
Assgn:1655:Secretarial	28	200	12.3%	87.7%
Assgn:1660:Typewriting	38	344	9.9%	90.1%
Assgn:1665:Distributive Education	10	2	83.3%	16.7%
Assgn:1822:Coordinator, Audio-visua	1	1	50.0%	50.0%
Assgn:1830:Dental Hygienist	2	0	100%	0.0%
Assgn:1850:Home or Sch Visitor	0	1	0.0%	100%
Assgn:1875:Sch Psychologist	0	1	0.0%	100%
Assgn:1890:Sch Nurse	0	1	0.0%	100%
Assgn:2361:Cooperative Education	1	30	3.2%	96.8%
Assgn:2600:Vocational Instruction	12	0	100%	0.0%
Assgn:2700:Ed Program Specialist	26	0	100%	0.0%
Assgn:2810:Elem	10	217	4.4%	95.6%
Assgn:2811:Gifted Classes, Elem	11	29	27.5%	72.5%
Assgn:2815:Supervisor, Elem Educ	0	10	0.0%	100%
Assgn:2827:Supervisor, Early Childh	1	0	100%	0.0%
Assgn:2840:Early Childhood	11	117	8.6%	91.4%
Assgn:2915:Supervisor, Curric & Ins	0	1	0.0%	100%
Assgn:2930:Supervisor, Pupil Pers S	0	2	0.0%	100%
Assgn:2935:Coordinator, Spec Funded	1	0	100%	0.0%
Assgn:3200:English:Communic	6	277	2.1%	97.9%
Assgn:3215:Supervisor, Engl:Communi	7	16	30.4%	69.6%
Assgn:3220:Drama	0	53	0.0%	100%
Assgn:3240:Journalism	1	117	0.8%	99.2%
Assgn:3250:Speech	3	99	2.9%	97.1%
Assgn:4030:Latin	3	40	7.0%	93.0%
Assgn:4410:French	2	163	1.2%	98.8%
Assgn:4411:French, Elem	0	2	0.0%	100%
Assgn:4415:Supervisor, Foreign Lang	3	10	23.1%	76.9%
Assgn:4420:German	1	57	1.7%	98.3%
Assgn:4421:German, Elem	0	2	0.0%	100%
Assgn:4430:Italian	1	8	11.1%	88.9%
Assgn:4440:Japanese	5	1	83.3%	16.7%
Assgn:4480:Russian	1	6	14.3%	85.7%
Assgn:4490:Spanish	6	171	3.4%	96.6%
Assgn:4491:Spanish, Elem	1	4	20.0%	80.0%
Assgn:4496:English as Second Lang S	9	15	37.5%	62.5%
Assgn:4498:English as Second Lang,	0	2	0.0%	100%
Assgn:4801:Health & Phys Ed, Elem	1	24	4.0%	96.0%
Assgn:4802:Health & Phys Ed, Sec	1	40	2.4%	97.6%
Assgn:4805:Health & Phys Ed, K-12	0	40	0.0%	100%
Assgn:4810:Health	3	79	3.7%	96.3%
Assgn:4813:Supv, Health & Phys Ed,	2	2	50.0%	50.0%
Assgn:4815:Supv, Health & Phys Ed,	2	6	25.0%	75.0%
Assgn:4817:Phys Ed	1	24	4.0%	96.0%
Assgn:4820:Environmental Ed	18	15	54.5%	45.5%
Assgn:4827:Supervisor, Health	0	2	0.0%	100%
Assgn:5210:Driver Ed	44	151	22.6%	77.4%
Assgn:5400:Safety Ed	11	28	28.2%	71.8%

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Minor 1995/6 Classroom Assignment	Assignments Inconsistent with Certification	Assignments Consistent with Certification	% Inconsistent	% Consistent
Assgn:5605:Home Economics	0	15	0.0%	100%
Assgn:5615:Supervisor, Home Economi	5	4	55.6%	44.4%
Assgn:6010:Ind Arts, Drawing	7	107	6.1%	93.9%
Assgn:6014:Ind Arts, Art Crafts	4	1	80.0%	20.0%
Assgn:6020:Ind Arts, Elect	6	29	17.1%	82.9%
Assgn:6025:Ind Arts, Auto	1	9	10.0%	90.0%
Assgn:6030:Ind Arts, Graphic Arts	7	48	12.7%	87.3%
Assgn:6035:Ind Arts, Ceramics	0	1	0.0%	100%
Assgn:6040:Ind Arts, Metal	8	68	10.5%	89.5%
Assgn:6045:Ind Arts, Plastics	2	7	22.2%	77.8%
Assgn:6050:Ind Arts, Wood	9	73	11.0%	89.0%
Assgn:6055:Ind Arts, Textiles	0	1	0.0%	100%
Assgn:6060:Ind Arts, Printing	0	8	0.0%	100%
Assgn:6410:Library Science, Elem	0	18	0.0%	100%
Assgn:6420:Library Science, K-12	1	11	8.3%	91.7%
Assgn:6800:Mathematics	27	163	14.2%	85.8%
Assgn:6815:Supervisor, Mathematics	2	12	14.3%	85.7%
Assgn:7201:Music, Elem	0	49	0.0%	100%
Assgn:7202:Music, Sec	0	33	0.0%	100%
Assgn:7205:Music, K-12	0	12	0.0%	100%
Assgn:7213:Supv, Music, Sec	2	2	50.0%	50.0%
Assgn:7215:Supv, Music, K-12	1	10	9.1%	90.9%
Assgn:7605:Develop Reading Classes	36	113	24.2%	75.8%
Assgn:7615:Supv, Reading	1	3	25.0%	75.0%
Assgn:7650:Diag:Prescriptive Readin	8	177	4.3%	95.7%
Assgn:8400:Arboretum, Aviary, Green	0	3	0.0%	100%
Assgn:8401:Planetarium, Metero Stat	2	12	14.3%	85.7%
Assgn:8405:Biology	7	206	3.3%	96.7%
Assgn:8415:Supv, Science	7	14	33.3%	66.7%
Assgn:8420:Chemistry	10	140	6.7%	93.3%
Assgn:8440:Earth & Space Science	20	39	33.9%	66.1%
Assgn:8450:General Science, Interm	0	414	0.0%	100%
Assgn:8470:Physics	5	170	2.9%	97.1%
Assgn:8490:Science, Interdisc Advan	17	1	94.4%	5.6%
Assgn:8805:Anthropology	1	7	12.5%	87.5%
Assgn:8815:Supv, Social Science	8	15	34.8%	65.2%
Assgn:8830:Economics	7	90	7.2%	92.8%
Assgn:8840:Geography	7	86	7.5%	92.5%
Assgn:8842:Government	2	107	1.8%	98.2%
Assgn:8845:History	4	208	1.9%	98.1%
Assgn:8860:Psychology, Social:Behav	44	46	48.9%	51.1%
Assgn:8861:Psychology, Interdis Sci	0	2	0.0%	100%
Assgn:8870:Philosophy	3	6	33.3%	66.7%
Assgn:8875:Social Studies	24	272	8.1%	91.9%
Assgn:8880:Sociology	4	76	5.0%	95.0%
Assgn:9205:Hearing Impaired	4	3	57.1%	42.9%
Assgn:9215:Supv, Special Ed	2	13	13.3%	86.7%
Assgn:9235:Mentally:Phys,Hand,Learn	1	78	1.3%	98.7%
Assgn:9270:Speech Correction	1	7	12.5%	87.5%
Assgn:9800:Social Restoration	1	1	50.0%	50.0%
Total	832	6,427	11.5%	88.5%

Source: Analysis of Certification and Prof. Pers. files.

6.6 Other Certification Issues: Waivers

Provisions exist for revocation of teaching certificates, and for the withdrawal by the teacher of certificates earned, as well as the use of waiver procedures by local school districts to hire non-certified personnel.[16] Finally, provisions exist for state certification of teachers prepared outside of Pennsylvania.

Under Chapter 49 of the Pennsylvania Regulations Governing Certification of Professional Personnel, the Pennsylvania Department of Education is enabled to issue an emergency certificate/permit to a graduate of an approved teacher preparation program when "...a *fully qualified* and properly certificated applicant is not available."

Several points are in order here. First, the term "fully qualified" is not defined in Chapter 49 and, because it is a condition beyond certification, it creates additional flexibility in the teacher recruitment process and undermines much, if not the entire notion, of teacher certification. While "fully qualified" might mean qualifications **beyond** the certification requirements in terms of further germane coursework, because it is not defined, it can be used to apply any criteria which

[16]In periods of declining enrollment, teachers with considerable experience may find it to their advantage to reduce the number of certificates which they have in order to narrow the range of subjects they may be asked to teach.

eliminates all but a favored candidate before a local school board, be that candidate certified or not. Conversations with a knowledgeable practitioner indicate that it is precisely this loop-hole in the current certification requirement which enables a superintendent to hire whomever he or she and a majority of the board want, regardless of state certification requirements.

One can contrast these waiver or emergency provisions with those of Michigan:

Rule 42 Full-Year Special Permits

> (1) A full-year special permit shall be issued when a properly certificated teacher is unavailable for a regular teaching assignment.

Unless the term "properly" can be interpreted to include criteria other than those applied to certification and the link between teaching assignment and certification, this is much tighter language than in Pennsylvania.

Rule 45 goes on to deal with permits in emergency situations, and allows a non-certified person "with reasonable qualifications" to teach if a candidate with substitute permit is not available **and** the failure to authorize this emergency permit will *deprive the children of an education.*[17] The superintendent must recommend to the State Board of Education that it issue the emergency permit.

Pennsylvania's language is unclear about who determines the availability of candidates. Given that Pennsylvania does not require the advertising of teaching vacancies, the issue of the availability or adequacy of the candidate pool can be readily manipulated. As noted in Chapter 5, the inventory of certificated teachers is far in excess of the number of current teachers in each certification area.

6.7 Comparison with Other States

Forty states require that a college degree be earned in conjunction with earning a teaching certificate from a regionally accredited institution. Pennsylvania does not require regional accreditation of teacher prepration programs. Of Pennsylvania's 90+ teacher preparation institutions, 16 are NCATE accredited. Remarkably, in Pennsylvania, there is a negative, highly significant statistical relationship between a district's high school students going on to post-secondary education and the district employing greater proportions of NCATE accredited teachers; it was -.38 in 1993 .[18]

Pennsylvania's certification requirements are silent about whether or not the prospective teacher must have a major in professional education. The program of preparation must be approved by PDE; 14 states require the prospective teacher's degree be an education major while 11 others prohibit the college major be in professional education. This second group of states includes California, Connecticut, Maine, Massachusetts, New Jersey, New York, Tennessee, and Utah. [19]

NASDTEC reports that Pennsylvania's program approval standards have the effect of requiring that prospective teachers take general education courses in humanities, fine arts, social science, history, and natural science. Thus, general studies in English and mathematics are not required in Pennsylvania, in contrast to virtually all of the other 37 states which have some sort of general education requirements.[20]

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[17] Note the education of children is the key to whether or not the emergency permit is provided.

[18] See also Strauss(1993) Table 5.38, p. 66, and Table 8.20, p. 132.

[19] See NASDTEC(1996), Table B-4.

[20] NASDTEC(1996), Table B-4.

At the turn of the century, all but nine states[21] issued life teaching certificates.[22] By 1996, however, only six states, including New Jersey, New York, and Pennsylvania, continued to issue permanent or life certificates. [23]

[21]Connecticut, Delaware, Louisiana, Massachusetts, Oklahoma, New Mexico, South Carolina, Vermont, and West Virginia.

[22]Elsbree(1939), p.346.

[23]NASDTEC(1996), Table E-1.

Chapter 7

Teacher Quality and Teacher Selectivity in Pennsylvania

It has been noted that in Pennsylvania better than 90 colleges and universities train teachers in various specialty areas, and that there is evidence that higher NTE scores are associated with higher public school student achievement and greater student success on competency exams. One naturally questions how much variation there is in teacher test scores in Pennsylvania, given that they have been required now for a decade.

7.1 Content Knowledge Levels of Secondary Teachers Trained by Institution In Pa.

Table 7.1 summarizes the range of NTE scores for elementary education and eight secondary specialty areas is Pennsylvania. For each test, test scores across time were grouped by the teacher preparation institution which the student indicated to ETS at the time of the exam, and the median of the test score distribution was determined. The table displays in parentheses the minimum passing score, the lowest median test score by institution, and the highest median test score by institution, along with the number of institutions for which NTE test scores exist.[1]

Table 7.1 also calculates the Weighted Percent Correct which the median score implies. As noted above, the test range is 250 to 990 in each case, and guessing is allowed without penalty on these examinations, there are really 740 points available to be earned since 250 points are available simply for taking the test. If we subtract 250 from the median score and from 990, we can calculate an indicator of what fraction of the test questions correctly answered the median score represents. However, because some questions and answers are weighted more heavily than others due to difficulty level, simply getting another question correct does not directly imply a direct percentage score.

The range of test scores between lowest and highest institutions is quite large, and in several instances the median score is below the minimum passing score. The range of weighted percentage correct varies from as low as 14% in Biology to as high as 84% in English. If one subtracts the lowest from the highest median score for each specialty test, one finds the largest range in Biology: the lowest median score was 355 and the highest median was 810, or a difference of 455 points.

Expensive liberal arts schools dominate the list of high performing teacher preparation institutions, and the high scores undoubtedly reflect their high admissions requirements and the quality of their programs.

[1] While over 90 institutions have approved programs, not all students in them elect to take the NTE or Praxis tests. Also, not all institutions have approved programs in all specialty areas.

Table 7.1: Lowest and Highest Median NTE Scores for Nine Content Areas in Pa.

(1)	(2)	(3)	(4)	(5)
Specialty Test	Number of Institutions	*Lowest* Median Inst.	(Passing) and Lowest Median Score	Wtd Percent Correct (Lowest Med)
Elementary	79	Ursinus	(570) under 570	43.2%
Mathematics	79	Cheyney	(540) 500	33.8%
Chemistry	64	Waynesburgh	(500) 380	17.6%
Biology	77	Cheyney	(580) 355	14.2%
Physics	50	Lincoln	(440) 285	4.7%
General Science	64	Holy Family	(none) under 520	36.5%
Earth and Space	32	King's College	(570)under 350	13.5%
English	78	Cheyney	(490) 580	44.6%
Social Studies	79	Waynesburgh	(580) 550	40.5%
Specialty Test	Number of Institutions	*Highest* Median Inst.	Highest Median Score	Wtd Percent Correct (Highest Med)
Elementary	79	Lafayette	over 700	60.8%
Mathematics	79	Swarthmore	740	66.2%
Chemistry	64	Chatham	720	63.5%
Biology	77	Lafayette	over 800	74.3%
Physics	50	Swarthmore	810	75.7%
General Science	64	Chatham	over 740	66.2%
Earth and Space	32	Lafayette	over 800	74.3%
English	78	Swarthmore	875	84.5%
Social Studies	79	Bryn Mawr	685	58.8%

Source: Analysis of NTE Data Files.

Tables 7.3 - 7.11 display the details underlying Table 7.1. In addition to showing the rank of the teacher preparation median test score, the test scores at the 25th and 75th percentiles are displayed, to the extent permitted, to give the reader a sense of the variability in content knowledge performance at each teacher preparation institution. The Institutional Type reflects the range of state financial involvement in the teacher preparation institution. There are 14 state system preparatory institutions, formerly normal schools, which receive substantial portions of their budgets from the State. These would compare to public universities in other states, as the State has direct regulatory and budgetary control over their activities There are three state related institutions (Penn State, Temple, and University of Pittsburgh), which were once entirely private but now receive significant (on the order of 20% of their operating budgets) state appropriations each year, but have substantial autonomy. Private state-related institutions (Drexel, University of Pennsylvania, and Pennsylvania College of Optometry) receive state appropriations for particular degree programs and do not receive general state financial assistance. The "Other" category of institution is out-of-state. While Pennsylvania maintains reciprocity agreements with other states, prospective teachers trained in other states must take the NTE/Praxis examinations and submit their scores and academic transcripts to Pennsylvania obtain teacher certification in Pennsylvania.

Table 7.2: Range of Employed Teachers' National Teacher Exam Scores: 1987-97 (Highest and Lowest Median NTE Score of School District by Pa. MSA)

MSA	Mathematics	Biology	Chemistry	Physics
Allentown	760-540	910-580	530-390	640-540
Altoona	610-560	660-620	720-690	NA
Beaver	720-540	750-725	590-470	700-410
Erie	650-580	790-610	560-490	460-380
Harrisburg	720-570	900-630	690-460	650-430
Johnstown	760-570	720-490	560-490	700-460
Lancaster	800-620	860-630	710-520	660-360
Philadelphia	850-560	825-600	770-440	820-460
Pittsburgh	730-510	860-480	770-415	740-380
Reading	730-510	780-620	640-530	NA
Scranton	710-560	810-390	NA	520-380
Sharon	790-590	750-675	600-450	NA
State College	800-640	840-690	NA	
Williamsport	650-550	NA	NA	NA
York	840-570	755-590	685-550	660-450
Non-MSA	800-540	910-570	910-390	645-450

Note: NA indicates too few teachers hired to display.

Also displayed is the employment rate, which is defined as the number of teachers hired from that institution by Pennsylvania school districts, Intermediate Units, and Area Vocational Schools, over the period 1987-97, divided by the number taking the test over the same period, and whose scores are reflected in the table. Where only a few students at an institution took the test, the scores are replaced by asterisks to maintain confidentiality of the results.

Table 7.12 summarizes these detailed statistics by reporting the correlation (or lack of correlation) between the preparatory institution's employment rate and the median test score by specialty area. One would expect that employment rates would be higher for institutions with higher scoring prospective teachers; however, this in only the case in math preparation. Otherwise the relationship is weak, or inverse. In the case of chemistry, the correlation is -.25; only the correlation results for math and chemistry are statistically reliable. This suggests that there may be a lack of selectivity in terms of content knowledge by Pennsylvania school districts in their recruiting of new teachers in these specialty areas.[2]

The excess supply of elementary education certificates is reflected in the low employment rates by institution. While earlier, self-reported data to the Pennsylvania Department of Education displayed employment rates on the order of 50% for private institutions, and 14-18% for those trained in the State System.[3], the employment rates are now generally quite low. At the institution level, less than 10% of the social studies graduates found teaching jobs in Pennsylvania over the last decade.

[2]See Chapter 8 below which reports the results of a state-wide survey of school superintendents, union presidents, and school board presidents.

[3]Also see Strauss(1993), Table 5.37, p. 65.

Table 7.3: Ranking of Teacher Preparation Institutions by Median Elementary Education NTE

Elem Ed. Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Lafayette College	*	*	*	1	Private	100%
2	Swarthmore College	685	710	730	36	Private	14%
3	Grove City	660	690	710	259	Private	11%
4	U of Pennsylvania	650	680	710	323	Private State-R	26%
5	Bryn Mawr College	*	675	*	2	Private	50%
6	Bucknell U	640	670	700	129	Private	4%
6	Chatham College	620	670	700	177	Private	6%
6	Lehigh U	630	670	700	74	Private	4%
6	Messiah College	640	670	700	264	Private	8%
6	Millersville U of Pa	640	670	700	1422	State System	15%
7	Allegheny College	635	660	685	44	Private	9%
7	Gettysburg College	630	660	680	81	Private	6%
7	Indiana U of Pa	620	660	690	1331	State System	9%
7	Seton Hill College	610	660	690	139	Private	3%
7	Wilson College	630	660	690	175	Private	15%
8	Beaver College	610	650	680	397	Private	26%
8	Chestnut Hill College	610	650	670	259	Private	22%
8	Elizabethtown College	630	650	690	181	Private	17%
8	Juniata College	630	650	690	141	Private	8%
8	Marywood College	620	650	680	272	Private	9%
8	Moravian College	620	650	680	197	Private	14%
8	Muhlenberg College	610	650	670	96	Private	8%
8	Penn State U	610	650	680	2320	State Related	13%
8	Philadelphia College of	630	650	690	96	Private	6%
8	Shippensburg U of Pa	620	650	680	756	State System	13%
8	Unknown/Out of State	610	650	680	8494	Other	10%
8	West Chester U of Pa	610	650	680	1563	State System	13%
9	Albright College	600	640	680	51	Private	8%
9	Bloomsburg U of Pa	610	640	670	1259	State System	8%
9	Duquesne U	600	640	680	510	Private	12%
9	E Stroudsburgh U of	610	640	670	734	State System	15%
9	Edinboro U of Pa	610	640	670	1148	State System	5%
9	Gwynedd-Mercy College	610	640	670	202	Private	18%
9	Holy Family College	600	640	680	437	Private	20%
9	Immaculata College	600	640	680	265	Private	9%
9	Kutztown U of Pa	610	640	670	1019	State System	10%
9	Lebanon Valley College	610	640	670	174	Private	14%
9	Lock Haven U	610	640	670	448	State System	7%
9	Slippery Rock U of P	610	640	670	1007	State System	7%
9	St Josephs U	610	640	670	370	Private	17%
9	U of Pittsburgh	610	640	680	1073	State Related	9%
9	York College of Pa	610	640	680	436	Private	13%
10	Widener U	600	635	670	252	Private	16%
11	Cabrini College	590	630	665	448	Private	10%
11	Cal U of Pa	590	630	660	804	State System	7%
11	Carlow College	600	630	670	93	Private	9%
11	Cedar Crest College	600	630	670	111	Private	6%
11	Clarion U of Pa	600	630	660	847	State System	6%
11	Eastern College	590	630	670	223	Private	11%
11	Geneva College	610	630	670	233	Private	6%
11	LaSalle U	600	630	670	294	Private	12%
11	Mansfield U of Pa	600	630	660	371	State System	6%
11	Mercyhurst College	600	630	670	174	Private	6%
11	Rosemont College	590	630	680	103	Private	5%
11	St Vincent College	600	630	670	74	Private	11%
11	Susquehanna U	605	630	660	100	Private	15%
11	U of Scranton	610	630	670	225	Private	6%
11	Villanova U	590	630	670	17	Private	18%
11	Westminister College	600	630	660	239	Private	9%
12	Alvernia College	590	620	660	198	Private	10%
12	College Misericordia	590	620	650	121	Private	1%
12	Gannon U	580	620	660	154	Private	3%
12	Kings College	590	620	650	176	Private	3%
12	Neumann College	590	620	660	139	Private	6%
12	Temple U	590	620	660	1121	State Related	32%
13	Drexel U	580	610	650	163	Private State-R	32%
13	St Francis College	580	610	650	145	Private	4%
13	Thiel College	580	610	640	45	Private	9%
13	Waynesburgh College	580	610	650	121	Private	4%
13	Wilkes U	580	610	640	173	Private	8%
14	Lycoming College	580	600	630	192	Private	5%
15	Point Park College	570	600	640	165	Private	6%
16	Lincoln U	550	580	610	62	State Related	7%
17	Cheyney U of Pa	520	570	600	195	State System	45%
18	Ursinus College	*	*	*	1	Private	*

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Elem Ed. Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate

Source: Analysis of NTE and Prof. Pers. files.

Table 7.4: Ranking of Teacher Preparation Institutions by Median NTE Math Score

Math Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Swarthmore College	710	740	780	9	Private	11%
2	Carnegie-Mellon U	*	700	*	3	Private	33%
2	Lebanon Valley College	610	700	720	23	Private	39%
3	Elizabethtown College	650	695	720	28	Private	39%
4		*	*	*	1	Private	100%
5	Messiah College	620	680	730	51	Private	22%
5	Philadelphia College of	*	680	*	3	Private	0%
6	Bryn Mawr College	*	675	*	4	Private	25%
6	E Stroudsburgh U of	600	675	730	40	State System	23%
7	Lycoming College	580	670	700	14	Private	14%
7	U of Pennsylvania	640	670	750	35	Private State-R	17%
7	West Chester U of Pa	630	670	730	85	State System	15%
8	Bucknell U	630	660	700	37	Private	32%
8	Grove City	610	660	720	79	Private	29%
9	Gannon U	610	655	720	10	Private	0%
9	Muhlenberg College	580	655	670	10	Private	30%
10	Allegheny College	630	650	660	13	Private	31%
10	Allentown College/St Fr	600	650	680	17	Private	12%
10	Penn State U	600	650	690	317	State Related	27%
10	Washington and Jefferson	620	650	690	10	Private	10%
11	Gettysburg College	*	645	*	4	Private	0%
12	Indiana U of Pa	600	640	680	196	State System	16%
12	Millersville U of Pa	600	640	700	187	State System	21%
12	Slippery Rock U of P	590	640	700	58	State System	26%
12	St Josephs U	560	640	730	33	Private	15%
12	U of Pittsburgh	600	640	690	189	State Related	19%
12	Ursinus College	600	640	680	19	Private	21%
12	Wilkes U	590	640	690	15	Private	40%
13	Drexel U	590	635	680	64	Private State-R	20%
13	Eastern College	580	635	670	14	Private	0%
14	Clarion U of Pa	580	630	670	93	State System	19%
14	Lehigh U	600	630	680	17	Private	35%
14	Susquehanna U	560	630	700	19	Private	11%
14	Unknown/Out of State	580	630	690	1158	Other	11%
15	Moravian College	610	625	700	18	Private	44%
16	Beaver College	580	620	660	53	Private	19%
16	Chatham College	590	620	660	17	Private	12%
16	College Misericordia	560	620	670	7	Private	29%
16	Dickinson College	600	620	780	7	Private	43%
16	Juniata College	610	620	680	13	Private	15%
16	Lock Haven U	580	620	655	76	State System	11%
16	Shippensburg U of Pa	580	620	660	130	State System	24%
16	Westminister College	590	620	670	29	Private	21%
17	Mansfield U of Pa	590	615	670	40	State System	18%
18	Albright College	575	610	660	12	Private	17%
18	Bloomsburg U of Pa	570	610	660	112	State System	25%
18	Duquesne U	560	610	660	77	Private	26%
18	Kings College	600	610	690	18	Private	22%
18	Mercyhurst College	590	610	670	9	Private	22%
18	St Francis College	560	610	630	21	Private	10%
18	Temple U	570	610	670	133	State Related	35%
18	U of Scranton	570	610	650	55	Private	22%
18	Villanova U	580	610	670	40	Private	23%
18	Wilson College	590	610	660	10	Private	60%
19	Point Park College	565	605	635	12	Private	17%
19	Widener U	570	605	650	46	Private	22%
20	Cal U of Pa	570	600	630	114	State System	17%
20	Cedar Crest College	540	600	640	11	Private	27%
20	Chestnut Hill College	*	600	*	4	Private	0%
20	Edinboro U of Pa	570	600	640	109	State System	17%
20	Gwynedd-Mercy College	570	600	630	23	Private	4%
20	Kutztown U of Pa	570	600	650	117	State System	16%
20	York College of Pa	570	600	630	33	Private	18%
21	Immaculata College	550	595	620	18	Private	11%
21	LaSalle U	560	595	700	34	Private	9%
21	Lincoln U	550	595	620	6	State Related	0%
21	Thiel College	530	595	620	14	Private	14%
22	Geneva College	570	590	640	35	Private	26%
22	Robert Morris College	580	590	610	5	Private	0%
23	Carlow College	540	585	620	14	Private	21%
23	Rosemont College	570	585	600	2	Private	50%
23	St Vincent College	550	585	615	40	Private	18%

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Math Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
24	Cabrini College	560	580	660	37	Private	14%
24	Seton Hill College	550	580	600	26	Private	12%
25	Alvernia College	540	570	590	7	Private	14%
25	Holy Family College	550	570	620	15	Private	27%
25	Waynesburgh College	540	570	590	19	Private	16%
26	Marywood College	550	565	600	22	Private	5%
27	Cheyney U of Pa	470	500	520	9	State System	11%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.5: Ranking of Teacher Preparation Institutions by Median Chemistry NTE Scores

Chemistry Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Chatham College	*	720	*	3	Private	33%
2	Allegheny College	*	690	*	4	Private	50%
3	Chestnut Hill College	*	685	*	4	Private	0%
5	Thiel College	*	*	*	1	Private	0%
5	Cedar Crest College	*	*	*	1	Private	0%
5	Lafayette College	*	*	*	1	Private	0%
6	Messiah College	*	650	*	4	Private	50%
7	Ursinus College	*	640	*	3	Private	33%
8	Widener U	500	640	650	5	Private	0%
8	Wilkes U	510	640	730	6	Private	0%
9	Beaver College	480	630	650	5	Private	20%
10	Bucknell U	590	620	690	6	Private	33%
10	Juniata College	530	620	690	10	Private	30%
10	Millersville U of Pa	560	610	650	17	State System	35%
10	Wilson College	550	610	680	11	Private	18%
11	Grove City	570	600	620	9	Private	11%
12	Kutztown U of Pa	500	590	630	14	State System	57%
12	Lycoming College	*	590	*	2	Private	50%
13	Penn State U	530	590	650	39	State Related	51%
13	Shippensburg U of Pa	465	590	645	8	State System	38%
13	Slippery Rock U of P	570	590	620	5	State System	40%
14	Susquehanna U	*	585	*	2	Private	50%
15	Eastern College	*	580	*	3	Private	0%
15	Indiana U of Pa	490	580	700	15	State System	53%
16	St Josephs U	455	575	675	8	Private	50%
17	Clarion U of Pa	500	570	630	7	State System	57%
17	Geneva College	490	570	680	6	Private	67%
17	St Vincent College	*	570	*	2	Private	50%
17	Unknown/Out of State	510	570	670	145	Other	20%
17	Westminister College	*	570	*	2	Private	0%
18	Drexel U	465	565	615	12	Private State-R	33%
19		*	*	*	1	Private	0%
19	Allentown College/St Fr	500	545	670	6	Private	50%
19	Lehigh U	420	545	620	6	Private	50%
19	U of Pittsburgh	490	545	680	48	State Related	31%
30	Gannon U	*	540	*	4	Private	25%
20	Mansfield U of Pa	490	540	620	6	State System	50%
20	Villanova U	530	540	630	5	Private	40%
21	St Francis College	*	535	*	2	Private	0%
21	Elizabethtown College	470	530	550	5	Private	60%
21	Temple U	470	530	650	19	State Related	26%
21	U of Scranton	450	530	620	6	Private	50%
21	West Chester U of Pa	520	530	610	19	State System	63%
22	Bloomsburg U of Pa	470	520	610	6	State System	17%
23	Lebanon Valley College	490	520	620	7	Private	43%
23	Lock Haven U	500	520	620	5	State System	100%
24	U of Pennsylvania	400	505	550	6	Private State-R	17%
25	Cal U of Pa	440	500	690	13	State System	31%
25	Edinboro U of Pa	430	500	570	11	State System	64%
26	Washington and Jefferson	440	490	510	6	Private	50%
27	E Stroudsburgh U of	390	480	550	11	State System	73%
27	Kings College	*	480	*	4	Private	50%
27	Mercyhurst College	*	480	*	3	Private	0%
28	Muhlenberg College	*	470	*	2	Private	50%
29		*	*	*	1	Private	0%
29	Alvernia College	*	450	*	2	Private	0%
29	Duquesne U	440	450	790	5	Private	40%
30	Albright College	*	*	*	1	Private	0%
31	Waynesburg College	370	380	400	5	Private	20%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.6: Ranking of Teacher Preparation Institutions by Median Biology NTE Score

Biology Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Lafayette College	*	*	*	1	Private	0%
2	U of Pennsylvania	770	810	820	7	Private State-R	29%
3	Swarthmore College	770	805	820	6	Private	0%
4	Gwynedd-Mercy C	650	800	810	5	Private	40%
5	Gettysburg Col	*	785	*	2	Private	0%
6	Alvernia College	*	780	*	2	Private	0%
7	Lehigh U	665	775	805	8	Private	75%
8	St Josephs U	620	770	840	10	Private	40%
9	Carlow College	650	760	830	7	Private	0%
9	Point Park Col	*	760	*	4	Private	50%
10	Bryn Mawr College	*	750	*	3	Private	0%
10	Cedar Crest College	*	750	*	4	Private	0%
10	Villanova U	740	750	780	9	Private	33%
11	Penn State U	660	745	790	54	State Related	32%
11	Bucknell U	650	740	770	17	Private	0%
11	Grove City	710	740	770	13	Private	23%
11	LaSalle U	670	740	800	11	Private	27%
11	Marywood College	720	740	770	7	Private	0%
11	Ursinus College	670	740	810	18	Private	22%
12	Slippery Rock	710	735	780	30	State System	17%
12	Susquehanna U	*	735	*	4	Private	25%
13	Washington and	*	730	*	2	Private	0%
13	West Chester U	670	730	770	50	State System	22%
13	Westminister C	685	730	800	8	Private	13%
14	Eastern College	600	720	780	8	Private	25%
14	Elizabethtown	680	720	800	9	Private	56%
15	Seton Hill Col	690	720	820	11	Private	36%
16	U of Scranton	670	715	770	18	Private	28%
16	Widener U	670	715	760	6	Private	50%
17	Kutztown U of	620	710	770	42	State System	31%
17	Millersville U	620	710	770	91	State System	13%
17	Shippensburg U	670	710	750	26	State System	15%
17	Unknown/Out of	630	710	780	390	Other	13%
18	Dickinson College	*	705	*	4	Private	25%
19	Albright College	650	700	760	6	Private	50%
19	Allentown College	650	700	700	5	Private	20%
19	Bloomsburg U o	630	700	760	35	State System	31%
19	Chatham College	*	700	*	2	Private	0%
19	Indiana U of P	670	700	760	69	State System	19%
19	Lebanon Valley	665	700	790	20	Private	30%
19	Lock Haven U	630	700	750	21	State System	10%
19	Mercyhurst Col	700	700	800	5	Private	0%
19	Muhlenberg Col	690	700	720	5	Private	0%
20	Edinboro U of	625	695	745	44	State System	23%
20	Juniata College	605	695	730	16	Private	13%
20	Messiah College	640	695	770	20	Private	10%
21	Cabrini College	630	690	770	13	Private	8%
21	Chestnut Hill	*	690	*	3	Private	0%
21	Clarion U of P	630	690	760	33	State System	9%
21	Drexel U	640	690	800	9	Private State-R	44%
21	Wilson College	670	690	730	15	Private	13%
22	St Francis Col	*	685	*	4	Private	0%
22	York College o	640	685	790	20	Private	20%
23	Beaver College	610	680	710	13	Private	15%
23	Holy Family College	560	680	700	7	Private	43%
24	Kings College	600	675	720	14	Private	0%
25	Lycoming College	640	670	750	21	Private	14%
25	U of Pittsburgh	620	670	735	88	State Related	25%
26	College Miseria	*	665	*	2	Private	0%
26	Temple U	615	665	720	32	State Related	56%
27	Gannon U	630	660	690	14	Private	21%
27	Wilkes U	600	660	720	15	Private	20%
28	Cal U of Pa	580	640	700	60	State System	22%
28	Geneva College	600	640	660	5	Private	0%
28	Immaculata Col	620	640	720	7	Private	14%
29	Allegheny College	*	635	*	4	Private	25%
30	E Stroudsburgh	590	630	670	42	State System	17%
31	Mansfield U	610	620	720	14	State System	7%
31	Moravian College	580	620	710	5	Private	60%
32	Duquesne U	570	615	700	22	Private	32%
33	St Vincent College	590	610	720	10	Private	30%
34	Thiel College	540	605	775	4	Private	0%
35	Lincoln U	580	*	580	1	State Related	0%
35	Waynesburgh College	*	540	*	2	Private	100%
36	Cheyney U of P	*	355	*	2	State System	0%

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Biology Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate

Source: Analysis of NTE and Prof. Pers. files.

Table 7.7: Ranking of Teacher Preparation Institutions by Median Physics NTE Score

Physics Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Swarthmore College	*	810	*	3	Private	67%
2	Westminister College	*	690	*	2	Private	0%
3	Villanova U	*	665	*	2	Private	50%
4	Dickinson College	*	635	*	2	Private	50%
5		*	*	*	1	Private	0%
5	U of Pennsylvania	520	630	670	8	Private State-R	63%
6	Duquesne U	460	610	720	9	Private	56%
6	Grove City	570	610	660	9	Private	33%
7	Slippery Rock U of P	460	600	620	6	State System	0%
7	Temple U	485	600	660	20	State Related	65%
7		*	*	*	1	Private	0%
8	Bloomsburg U of Pa	470	590	670	7	State System	43%
9		*	*	*	1	Private	0%
9	Muhlenberg College	*	575	*	2	Private	50%
9	Ursinus College	515	575	650	8	Private	25%
10	Gettysburg College	*	570	*	2	Private	100%
10	Lock Haven U	530	570	600	5	State System	20%
10	Unknown/Out of State	460	570	670	101	Other	29%
11	Bryn Mawr College	*	560	*	2	Private	50%
12	LaSalle U	*	555	*	4	Private	75%
12	Penn State U	500	555	615	28	State Related	46%
12	West Chester U of Pa	480	555	620	14	State System	21%
13	Edinboro U of Pa	475	550	600	8	State System	63%
13	Wilkes U	400	550	630	11	Private	64%
14	Millersville U of Pa	480	545	600	18	State System	28%
15	U of Pittsburgh	470	535	620	26	State Related	15%
16	Drexel U	460	530	600	47	Private State-R	40%
16	St Vincent College	480	530	570	13	Private	31%
17	Clarion U of Pa	475	525	535	12	State System	25%
17	U of Scranton	480	525	570	6	Private	33%
18	Bucknell U	*	520	*	3	Private	33%
18	Shippensburg U of Pa	490	520	560	6	State System	17%
19	Lehigh U	470	510	550	6	Private	33%
20	Indiana U of Pa	420	500	550	15	State System	33%
21	Kutztown U of Pa	420	495	550	14	State System	7%
22	Elizabethtown College	*	490	*	3	Private	0%
22	Widener U	390	490	655	8	Private	13%
23	E Stroudsburgh U of	435	480	530	12	State System	25%
23	Lycoming College	460	480	500	5	Private	40%
24	Mansfield U of Pa	445	465	535	8	State System	0%
25	Susquehanna U	*	465	*	2	Private	50%
26	Geneva College	*	460	*	2	Private	0%
27	Kings College	*	450	*	2	Private	50%
27	Lebanon Valley College	440	450	530	7	Private	29%
28	Cal U of Pa	400	440	580	13	State System	62%
29	St Josephs U	*	400	*	3	Private	100%
30	Albright College	*	380	*	3	Private	33%
31	Gannon U	*	*	*	1	Private	100%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.8: Ranking of Teacher Preparation Institutions by Median General Science NTE Scores

Gen Sci Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Chatham College	*	*	*	1	Private	0%
2	Messiah College	*	750	*	2	Private	0%
3	LaSalle U	*	730	*	3	Private	0%
4	Elizabethtown C	*	725	*	4	Private	25%
5	Carnegie-Mellon	*	700	*	3	Private	0%
5	U of Scranton	570	700	720	7	Private	14%
6	Allegheny College	680	690	740	5	Private	0%
6	U of Pennsylvania	660	690	720	11	Private State-R	36%
7	St Francis College	*	685	*	2	Private	0%
8	Grove City	630	680	720	32	Private	38%
8	Penn State U	630	680	710	54	State Related	13%
8	Slippery Rock U	650	680	710	29	State System	24%
9	Lafayette College	*	675	*	2	Private	0%
10		*	*	*	1	Private	0%
10	Lehigh U	650	670	690	9	Private	22%
11	Lock Haven U	620	665	700	14	State System	14%
11	Widener U	560	665	690	6	Private	17%
12	Albright College	*	660	*	4	Private	25%
12	Bucknell U	600	660	690	7	Private	14%
12	Dickinson College	*	660	*	3	Private	33%
12	Unknown/Out of	600	660	710	443	Other	13%
12	York College of	600	660	680	23	Private	26%
13	Duquesne U	590	655	690	14	Private	43%
13	Gannon U	620	655	680	6	Private	0%
13	St Josephs U	610	655	720	14	Private	36%
13	West Chester U	600	655	730	18	State System	6%
14	Beaver College	580	650	710	18	Private	39%
14	Clarion U of Pa	600	650	690	25	State System	40%
14	Edinboro U of P	610	650	680	27	State System	15%
14	Geneva College	620	650	680	7	Private	43%
14		*	*	*	1	Private	0%
14	Mansfield U of	590	650	680	15	State System	20%
14	Mercyhurst College	630	650	650	5	Private	20%
14	Temple U	610	650	680	35	State Related	31%
15	Indiana U of Pa	590	640	670	31	State System	19%
15	Marywood College	620	640	670	4	Private	0%
15	Millersville U	630	640	700	5	State System	0%
15	Muhlenberg College	*	640	*	3	Private	33%
15	Shippensburg U	600	640	670	17	State System	18%
15	U of Pittsburgh	600	640	700	51	State Related	24%
15	Ursinus College	600	640	680	6	Private	50%
16	Bloomsburg U of	590	635	675	28	State System	25%
17	Lycoming College	590	630	680	11	Private	9%
18		*	*	*	1	Private	0%
18	Juniata College	555	620	685	8	Private	38%
18		*	*	*	1	Private	0%
18	Villanova U	590	620	680	9	Private	0%
19	Kutztown U of P	590	615	680	34	State System	38%
20	Alvernia College	555	610	665	12	Private	8%
20	Cal U of Pa	590	610	660	21	State System	19%
20	E Stroudsburgh	580	610	650	34	State System	29%
21	Moravian College	*	600	*	4	Private	0%
21		*	*	*	1	Private	0%
22		*	*	*	1	Private	0%
22	Chestnut Hill C	*	590	*	3	Private	67%
22	Drexel U	560	590	665	20	Private State-R	15%
22	Kings College	530	590	700	7	Private	0%
22		*	*	*	1	Private	0%
23	Cheyney U of Pa	530	585	630	6	State System	0%
24	Cedar Crest Col	550	580	600	5	Private	20%
24	Waynesburgh Col	*	580	*	3	Private	0%
25	Susquehanna U	500	575	645	4	Private	25%
26	Lincoln U	*	*	*	1	State Related	0%
27	Holy Family Col	*	*	*	1	Private	0%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.9: Ranking of Teacher Preparation Institutions by Median Earth and Space NTE

Earth Space Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Lafayette College	*	*	*	1	Private	0%
2	Villanova U	*	*	*	1	Private	0%
3	Allegheny College	*	*	*	1	Private	0%
4	U of Pennsylvania	*	*	*	1	Private State-R	0%
5	Widener U	*	730	*	3	Private	0%
6	Dickinson College	*	715	*	4	Private	25%
7	Lock Haven U	660	700	710	6	State System	0%
8	Drexel U	*	*	*	1	Private State-R	0%
9	E Stroudsburgh U of	610	670	720	11	State System	9%
10	Millersville U of Pa	610	660	690	41	State System	29%
10	West Chester U of Pa	560	660	700	45	State System	24%
11	Kutztown U of Pa	600	650	710	21	State System	38%
11	Penn State U	600	650	740	49	State Related	20%
12	Edinboro U of Pa	550	645	720	20	State System	5%
12	Slippery Rock U of P	585	645	730	16	State System	6%
13	Bloomsburg U of Pa	580	640	670	21	State System	10%
13	Juniata College	*	640	*	3	Private	33%
13	Mansfield U of Pa	550	640	690	11	State System	9%
13	Mercyhurst College	560	640	650	6	Private	17%
13	Shippensburg U of Pa	560	640	660	33	State System	27%
13	Temple U	570	640	720	9	State Related	33%
13	Unknown/Out of State	550	640	700	93	Other	10%
14	U of Pittsburgh	615	635	715	16	State Related	6%
15	Alvernia College	*	620	*	2	Private	0%
16	Indiana U of Pa	560	610	670	25	State System	4%
16	LaSalle U	*	610	*	4	Private	0%
17	Gannon U	*	605	*	4	Private	25%
18	Lehigh U	*	580	*	3	Private	33%
19	Cal U of Pa	530	570	610	35	State System	11%
20	Wilkes U	470	550	620	9	Private	0%
21	Clarion U of Pa	500	540	640	31	State System	7%
22	Kings College	*	*	*	1	Private	0%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.10: Ranking of Teacher Preparation Institution by Median English NTE Score

English Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Swarthmore College	800	875	915	16	Private	19%
2	Bryn Mawr College	*	870	*	3	Private	0%
2	Chatham College	830	870	885	8	Private	25%
3		*	*	*	1	Private	0%
3	Wilson College	710	850	870	10	Private	10%
4	U of Pennsylvania	760	845	895	44	Private tate-R	27.3%
5	Dickinson College	750	830	850	13	Private	8%
5	Eastern College	760	830	905	8	Private	0%
5	Susquehanna U	710	830	890	9	Private	11%
6	Grove City	790	820	880	23	Private	35%
6	Immaculata College	705	820	860	12	Private	8%
7	York College of Pa	*	815	*	2	Private	0%
8	Beaver College	750	810	880	29	Private	24%
8	Muhlenberg College	750	810	850	18	Private	17%
9	Messiah College	770	805	830	16	Private	13%
10	Indiana U of Pa	720	800	850	74	State System	20%
10	Juniata College	735	800	830	12	Private	25%
10	Thiel College	*	800	*	3	Private	0%
11	Gettysburg College	760	795	840	14	Private	7%
12	Lehigh U	750	790	890	6	Private	67%
12	St Josephs U	730	790	830	38	Private	3%
13	Bucknell U	750	780	830	22	Private	18%
13	Edinboro U of Pa	700	780	830	62	State System	18%
13	LaSalle U	730	780	880	26	Private	31%
13	Millersville U of Pa	725	780	830	140	State System	19%
13	Moravian College	760	780	870	13	Private	8%
13	Philadelphia College of	720	780	890	13	Private	0%
13	Unknown/Out of State	710	780	850	754	Other	15%
13	Villanova U	720	780	850	29	Private	10%
13	West Chester U of Pa	700	780	850	91	State System	12%
14	Lycoming College	710	775	810	10	Private	30%
15	Cal U of Pa	690	770	820	35	State System	17%
15	Penn State U	710	770	820	226	State Related	24%
15	Temple U	680	770	830	82	State Related	16%
16	Cabrini College	650	760	830	25	Private	12%
16	Clarion U of Pa	675	760	810	60	State System	40%
16	E Stroudsburgh U of	700	760	830	40	State System	23%
16	Kutztown U of Pa	650	760	820	93	State System	25%
16		*	*	*	1	Private	0%
16	Lock Haven U	700	760	820	31	State System	19%
16	Mansfield U of Pa	690	760	800	19	State System	16%
16	Ursinus College	680	760	830	23	Private	17%
17	Cedar Crest College	710	755	820	6	Private	17%
18	Lincoln U	*	750	*	4	State Related	25%
18	Shippensburg U of Pa	680	750	810	70	State System	23%
19	Elizabethtown College	700	745	830	18	Private	22%
19	Lebanon Valley College	680	745	870	14	Private	29%
20	Allegheny College	690	740	790	9	Private	11%
20	Geneva College	610	740	870	15	Private	13%
20	U of Pittsburgh	660	740	810	112	State Related	22%
21	Bloomsburg U of Pa	700	735	795	44	State System	21%
21	Wilkes U	690	735	790	16	Private	44%
22	Gwynedd-Mercy College	660	730	850	11	Private	18%
22	Mercyhurst College	680	730	800	11	Private	27%
22	U of Scranton	660	730	810	38	Private	11%
22	Waynesburgh College	610	730	800	15	Private	20%
23	Carlow College	650	725	800	10	Private	40%
23	St Francis College	635	725	780	20	Private	30%
24	Albright College	630	720	800	10	Private	10%
24	Duquesne U	660	720	820	79	Private	15%
24	Holy Family College	630	720	750	13	Private	15%
24	St Vincent College	640	720	830	17	Private	29%
25	Slippery Rock U of P	645	715	780	72	State System	19%
26	Alvernia College	670	710	910	6	Private	17%
26	Robert Morris College	600	710	820	18	Private	6%
27	Washington and Jefferson	625	705	790	12	Private	25%
28	Gannon U	630	700	860	13	Private	8%
28	Kings College	640	700	780	23	Private	4%
28			*	*	1	Private State-R	d 0.0%
30	Chestnut Hill College	640	695	820	6	Private	33%
30	Marywood College	650	695	760	14	Private	21%
31	Seton Hill College	580	690	790	15	Private	0%
32	Allentown College/St Fr	630	670	790	3	Private	0%
33	Westminister College	620	670	710	15	Private	7%
33	Widener U	630	670	830	33	Private	9%

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English Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
34	Point Park College	590	660	730	9	Private	0%
35	College Misericordia	*	595	*	2	Private	100%
36	Cheyney U of Pa	*	580	*	3	State System	0%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.11: Ranking of Teacher Preparation Institutions by Median Social Studies NTE Score

Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
1	Bryn Mawr College	680	685	690	6	Private	0%
2	Grove City	640	680	710	47	Private	2%
2	Swarthmore College	630	680	700	24	Private	4%
3	Chatham College	630	660	670	13	Private	8%
3	Gettysburg College	605	660	700	32	Private	13%
3	Messiah College	620	660	700	53	Private	6%
3	U of Pennsylvania	610	660	690	80	Private State-R	15%
4	Ursinus College	610	650	690	33	Private	6%
5	Gwynedd-Mercy College	630	640	670	19	Private	5%
5	Lehigh U	600	640	680	22	Private	0%
5	Muhlenberg College	610	640	700	26	Private	15%
5	Neumann College	570	640	650	5	Private	0%
5	Penn State U	610	640	680	390	State Related	14%
5	Wilson College	600	640	690	42	Private	12%
6	Beaver College	590	630	700	26	Private	39%
6	Dickinson College	590	630	660	35	Private	9%
6	Elizabethtown College	595	630	660	28	Private	7%
6	Gannon U	580	630	690	23	Private	17%
6	Immaculata College	605	630	675	16	Private	0%
6	LaSalle U	590	630	660	54	Private	13%
6	Lafayette College	*	630	*	3	Private	0%
6	Philadelphia College of	580	630	690	15	Private	0%
6	U of Pittsburgh	590	630	680	183	State Related	13%
6	U of Scranton	590	630	650	77	Private	7%
6	Unknown/Out of State	590	630	680	1616	Other	9%
6	Villanova U	600	630	670	38	Private	13%
6	West Chester U of Pa	600	630	680	327	State System	14%
7	Allentown College/St Fr	580	620	680	38	Private	5%
7	Carlow College	590	620	660	13	Private	0%
7	Duquesne U	590	620	660	170	Private	7%
7	Indiana U of Pa	590	620	660	178	State System	8%
7	Lock Haven U	590	620	650	102	State System	13%
7	Mercyhurst College	590	620	660	29	Private	10%
7	Millersville U of Pa	580	620	665	332	State System	12%
7	Seton Hill College	590	620	660	17	Private	0%
7	Shippensburg U of Pa	590	620	670	195	State System	13%
7	Slippery Rock U of P	590	620	660	138	State System	12%
7	St Josephs U	590	620	680	67	Private	10%
7	Susquehanna U	580	620	660	23	Private	13%
7	Temple U	580	620	680	123	State Related	11%
8	Albright College	580	615	660	26	Private	12%
8	Chestnut Hill College	*	615	*	4	Private	0%
8	York College of Pa	580	615	640	82	Private	16%
9	Bloomsburg U of Pa	580	610	650	155	State System	10%
9	Bucknell U	580	610	660	52	Private	8%
9	Cabrini College	570	610	660	39	Private	15%
9	College Misericordia	540	610	630	13	Private	0%
9	E Stroudsburgh U of	580	610	640	151	State System	11%
9	Edinboro U of Pa	580	610	660	135	State System	10%
9	Holy Family College	590	610	670	20	Private	15%
9	Kutztown U of Pa	580	610	660	269	State System	12%
9	Lebanon Valley College	560	610	650	39	Private	13%
9	Mansfield U of Pa	580	610	650	73	State System	7%
9	Moravian College	600	610	640	41	Private	7%
9	Rosemont College	550	610	620	5	Private	0%
9	St Vincent College	580	610	660	52	Private	15%
9		*	*	*	1	Private State-R	0%
9	Widener U	560	610	650	57	Private	7%
10	Allegheny College	590	600	640	9	Private	11%
10	Cedar Crest College	570	600	630	10	Private	0%
10	Geneva College	580	600	630	34	Private	18%
10	Juniata College	580	600	630	47	Private	9%
10	Kings College	550	600	650	42	Private	2%
10	Wilkes U	570	600	640	51	Private	8%
11	Alvernia College	560	595	650	14	Private	14%
12	Cal U of Pa	550	590	630	118	State System	11%
12	Clarion U of Pa	570	590	630	152	State System	8%
12	Eastern College	560	590	660	25	Private	28%
12	Lycoming College	550	590	630	57	Private	7%
12	Marywood College	580	590	630	9	Private	0%

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Rank	Institution	Score 25%	Median Score	Score 75%	No. Testing	Instit. Type	Empl. Rate
12	St Francis College	540	590	640	24	Private	21%
12	Washington and Jefferson	540	590	620	49	Private	10%
13	Thiel College	515	585	635	16	Private	0%
14	Westminister College	550	580	610	45	Private	7%
15	Cheyney U of Pa	530	570	580	9	State System	11%
15		*	*	*	1	Private State-R	0%
16	Lincoln U	540	560	580	9	State Related	0%
17	Point Park College	505	550	600	24	Private	0%
17	Waynesburgh College	500	550	590	32	Private	3%

Source: Analysis of NTE and Prof. Pers. files.

Table 7.12: Employment Rate and Median Test Score Relationships

(1)	(2)	(3)	(4)
Specialty	No. Inst.	Correlation: Empl Rate Median Score	Mean Empl Rate
Elementary	79	-0.0185	16.9%
Math	79	0.2400	20.8%
Chem	64	-0.2580	22.0%
Biology	77	-0.0400	20.0%
Gen Science	64	0.0430	16.3%
Physics	52	-0.0125	34.9%
Earth and Space	32	-0.0799	11.9%
English	78	-0.1500	17.6%
Social Studies	79	0.0360	8.5%

Source: Analysis of NTE and Prof. Pers. files.

7.2 Selectivity of Local Teacher Hires: 1987-96

Given the range in content knowledge of teachers trained in Pennsylvania teacher preparation institutions, a question arises about the final result of the hiring process. Do Pennsylvania school districts successfully select new hires from the vast number of teachers offering themselves to the labor market each year? Several sorts of information are available to answer this question.

One can look at the place where teachers got hired in relation to where they get hired. the two locations to ascertain if the teacher markets are local, regional, state-wide, or national in character. One can also look at the test scores of teachers hired in relation to the distribution of all test scores to see how selective, in terms of content knowledge, school districts have been. Also, as reported in Section 8, this project directly asked school districts about the nature of their employment procedures and experience.

It appears, based on 1993 analysis, that most districts hire from local institutions. An exhaustive analysis[4] indicates that 60% of newly hired teachers come from institutions no more than 70 miles away from the hiring school district. For Allentown, Erie, Lancaster, Pittsburgh, and Sharon metropolitan school districts, 90% of the teachers come from 70 miles or less, while districts in the Philadelphia, Johnstown, Reading, and Williamsport MSAs hired 80% of their teachers from within 70 miles.

Table 7.13 displays Pennsylvania's MSAs and the distribution of NTE Elementary Exam scores for the period 1987-96. School districts in the State College MSA were most selective, and the median NTE score for elementary school teachers was 700 which compares to a median score of 640 in school districts in the Scranton, Altoona, and Philadelphia MSAs. Other columns show the first quartile NTE Elementary score, third quartile or 75th percentile NTE Elementary score, and the average salary and median year when such hires took place.

[4]See Strauss(1993), pp. 44-46.

Such MSA level statistics may hide variation within the area, as districts of various levels of wealth and selectivity seek out elementary school teachers. Table 7.14 displays the same information for every MSA and school district in Pennsylvania. To aid in its interpretation, the districts within each MSA were ranked from highest median NTE Elementary score to lowest. The MSA median NTE score is also shown (from Table 7.13). Where fewer than five elementary school teachers were hired over the period 1987-96 (the period for which test scores were required and available for this study), the data were omitted, but the district's rank, in terms of median NTE elementary test score, was retained.

Inspection of the school district level data indicates that the variation in test scores *within* a MSA is often greater than *among* MSAs. While the range of median scores across MSA's was from 700 to 640, within the Allentown MSA, the range of median NTE scores was from 690 to 620. Another way to examine this table is to look at the first quartile NTE score of the lowest ranked district, to the 3rd quartile NTE score of the highest ranked district. They often differ by 100 points or more and indicate the wide range of content knowledge which different teachers bring to the classroom.

It is often stated that salary is central to obtaining high quality district teachers; however, if one examines the average salary of teachers in highly ranked districts compared to those in lower ranked districts for teachers for whom test scores are available, the relationship is not evident. Again, focusing on the Allentown MSA, East Penn School District had the highest scoring elementary teachers with a median of 690, and an average salary of $30,514 based on two years of experience for the teachers whose scores were known, and who were hired, on average, in 1994. Bethlehem Area school district had an average salary of $32,134 and a median score of 620 for teachers with two years of experience, also hired, on average in 1994. It should also be noted that East Penn is a community with a much higher per capita income than Bethlehem, compare $16,724 to $11,586 (or $66,890 vs. $46,344 for families of four). Salisbury Township school district, in the same MSA, had higher per capita income than East Penn, paid a higher mean salary , and had a median elementary NTE score of 640.

One can find throughout Table 7.14 examples of school districts with high per capita income, high initial salaries and test scores which are lower than those of school districts which are not as well off and do not pay as high salaries. In the Pittsburgh MSA, the Burrell school district, with a per capita income of $10,596 was 4th highest ranked among over 90 districts in the region in terms of its elementary school teachers' median NTE score, and paid a starting salary of $24,150 in 1993. Other districts with higher per capita income, such as Fox Chapel with a per capita income of $26,124 and an average salary of $32,534 in 1994 with two years of experience, had a median elementary NTE test score of 650, the MSA-wide median.

Table 7.13: Selectivity of Elementary School Teacher Hires: Districts Ranked by Median NTE Elementary Test Score: 1987-96

MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Allentown MSA	$11,311	157	620	650	680	$30,620	2	1994
Altoona MSA	$7,672.	12	630	640	710	$26,883	1	1993
Beaver MSA	$8,154	68	610	640	670	$28,296	1	1994
Erie MSA	$8,866.	60	640	665	695	$26,295	2	1993
Harrisburg MSA	$11,070	207	630	650	690	$27,800	2	1994
Johnstown MSA	$6,760	28	645	660	690	$22,016	2	1995
Lancaster MSA	$12,324	180	640	680	710	$29,243	2	1994
Scranton MSA	$9,338.	178	610	640	680	$27,000	2	1995
Philadelphia MSA	$15,027	2243	600	640	670	$27,841	1	1994
Pittsburgh MSA	$9,843	452	620	650	690	$28,100	1	1994
Reading MSA	$12,607	150	630	670	700	$28,596	1	1994
Sharon MSA	$8,274	43	620	660	690	$28,411	1	1995
State College MSA	$9,277	26	670	700	710	$26,905	1	1994
Williamsport MSA	$9,774	24	590	645	695	$30,567	1	1994
York MSA	$12,120	239	630	660	690	$26,594	1	1994
Non-MSA	$8,108	377	610	650	680	$27,200	1	1994

Source: Analysis of NTE and Prof. Pers. files.

Table 7.14: Selectivity of Elementary School Teacher Hires: Districts Ranked by Median NTE Elementary Test Score: 1987-96

MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Allentown MSA								
East Penn S D	$16,724	23	650	690	720	$30,514	2	1994
Lehigh Area S D	$9,536	2	.	680	.	$30,250	2	1994
Northwestern Lehigh S D	$13,438	2	.	670	.	$29,500	1	1993
Allentown City S D	$9,664	14	640	665	680	$31,400	2	1993
Jim Thorpe AREA S D	$9,812	4	.	660	.	$29,300	1	1996
Nazareth Area S D	$12,984	11	630	660	690	$28,660	1	1994
Bangor Area S D	$10,724	10	620	655	670	$26,400	2	1995
Parkland S D	$17,252	18	630	650	690	$34,000	1	1995
MSA Wide Data	$11,311	157	620	650	680	$30,620	2	1994
Southern Lehigh S D	$14,970	13	610	650	670	$32,000	2	1994
Pen Argyl AREA S D	$11,312	3	.	650	.	$26,648	1	1996
Saucon Valley S D	$13,834	6	620	645	690	$27,955	2	1995
Northampton Area S D	$11,898	3	.	640	.	$22,064	2	1993
Salisbury Twp S D	$17,416	5	.	640	.	$32,650	1	1994
Panther Valley S D	$7,160	2	.	635	.	$18,500	1	1993
Whitehall Coplay S D	$11,540	6	620	630	660	$32,750	2	1996
Wilson Area S D	$10,202	7	600	620	690	$29,123	2	1996
Bethlehem Area S D	$11,586	25	580	620	650	$32,134	2	1994
Altoona MSA								
Spring Cove S D	$8,250	2	.	710	.	$26,165	1	1993
MSA Wide Data	$7,672.	12	630	640	710	$26,883	1	1993
Altoona Area S D	$7,507	7	630	630	710	$27,160	1	1993
Erie MSA								
North East S D	$10,442	5	.	690	.	$25,996	2	1994
General Mclane S D	$8,127	7	650	680	700	$22,278	3	1992
Northwestern S D	$7,761	4	.	675	.	$27,090	2	1995
Millcreek Township S D	$13,356	6	600	675	700	$24,280	1	1993
Iroquois S D	$8,866	2	.	675	.	$11,420	3	1988
Fairview S D	$18,576	6	640	670	720	$26,000	1	1995
Girard S D	$8,978	5	.	670	.	$28,250	1	1995
Corry Area S D	$7,705	2	.	665	.	$27,973	6	1993
MSA Wide Data	$8,866.	60	640	665	695	$26,295	2	1993
Harbor Creek S D	$9,424	2	.	660	.	$24,956	1	1994
Erie City S D	$7,926	18	630	650	670	$28,910	2	1994
Union City AREA S D	$6,830	3	.	620	.	$24,850	1	1994
Harrisburg MSA								
South Middleton S D	$11,070	4	.	720	.	$28,100	2	1995
Cumberland Valley S D	$15,188	10	630	710	720	$27,742	2	1995
Annville-Cleona S D	$11,244	4	.	695	.	$27,800	1	1994
Camp Hill S D	$17,688	8	665	690	700	$24,981	3	1993
Newport S D	$9,222	3	.	690	.	$25,676	1	1996
Lower Dauphin S D	$12,332	5	.	690	.	$30,297	2	1995
Eastern Lebanon CO S D	$10,980	2	.	675	.	$27,198	1	1992
West Shore S D	$13,338	11	630	670	710	$32,450	3	1993
Mechanicsburg Area S D	$14,758	14	650	670	700	$27,000	3	1994
Derry Twp S D	$16,166	13	620	670	700	$28,000	2	1993
Big Spring S D	$10,224	11	620	670	680	$25,981	1	1995
Susquenita S D	$10,412	5	.	670	.	$25,605	1	1993
Central Dauphin S D	$13,182	23	640	660	700	$26,723	1	1994
Cornwall-Lebanon S D	$11,304	7	640	660	690	$29,000	1	1994
Shippensburg Area S D	$8,133	3	.	660	.	$30,278	1	1996
Lebanon S D	$8,508	12	590	655	670	$28,847	2	1994
Palmyra Area S D	$13,124	11	630	650	690	$27,867	2	1995
MSA Wide Data	$11,070	207	630	650	690	$27,800	2	1994
Northern Lebanon S D	$10,596	6	590	650	650	$16,321	2	1989
Carlisle Area S D	$11,668	2	.	645	.	$24,543	4	1994
Greenwood S D	$9,086	3	.	640	.	$25,883	1	1995
West Perry S D	$9,528	5	.	640	.	$25,282	1	1993
Steelton-Highspire S D	$9,768	5	.	640	.	$24,211	1	1993
Millersburg Area S D	$10,562	3	.	630	.	$23,780	2	1993
Harrisburg City S D	$7,521	26	590	625	650	$28,291	3	1995
Susquehanna Twp S D	$14,452	8	610	625	650	$28,097	1	1994
Johnstown MSA								
Salisbury-Elk LICK S D	$6,340	2	.	710	.	$18,750	1	1996
Conemaugh Valley S D	$6,426	2	.	690	.	$18,500	2	1994
Penn-Cambria S D	$6,760	5	.	670	.	$25,000	1	1996
Ferndale Area S D	$6,622	3	.	670	.	$18,500	1	1995

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MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Forest Hills S D	$7,294	2	.	665	.	$22,000	1	1996
Westmont Hilltop S D	$15,752	6	660	660	740	$27,778	4	1993
MSA Wide Data	$6,760	28	645	660	690	$22,016	2	1995
Turkeyfoot Valley AREA SD	$5,505	2	.	645	.	$18,500	1	1993
Shanksville-Stnycrk S D	$8,041	2	.	640	.	$21,350	1	1995
Meyersdale Area S D	$6,382	2	.	620	.	$22,016	1	1993
Lancaster MSA								
Warwick S D	$14,362	10	700	725	740	$28,110	2	1994
Columbia Boro S D	$8,888	3	.	710	.	$28,053	1	1996
Elizabethtown Area S D	$11,002	14	690	705	730	$28,253	2	1993
Solanco S D	$9,530	4	.	705	.	$29,243	1	1993
Cocalico S D	$12,354	11	650	690	730	$31,185	1	1994
Manheim Twp S D	$17,848	15	650	690	720	$30,700	2	1993
Conestoga Valley S D	$13,888	4	.	690	.	$17,972	4	1992
Eastern Lancaster CO SD	$11,612	14	670	685	720	$28,895	2	1993
Lampeter-Strasburg S D	$14,004	7	650	680	710	$30,643	5	1995
Penn Manor S D	$11,190	25	650	680	710	$29,306	1	1993
MSA Wide Data	$12,324	180	640	680	710	$29,243	2	1994
Pequea Valley S D	$9,752	4	.	665	.	$25,810	3	1994
Hempfield S D	$15,050	26	610	655	680	$27,078	1	1994
Lancaster S D	$9,664	30	620	650	690	$33,288	2	1994
Ephrata Area S D	$12,314	7	630	650	670	$31,027	2	1994
Donegal S D	$12,356	5	.	640	.	$28,160	1	1994
Scranton MSA								
Stroudsburgh Area S D	$11,194	21	640	670	690	$31,640	2	1995
Benton Area S D	$7,919	2	.	665	.	$25,040	1	1994
East Strousbg AREA S D	$9,964	36	635	665	695	$25,000	2	1995
Abington Heights S D	$17,824	2	.	665	.	$24,000	2	1994
Mid Valley S D	$8,310	3	.	660	.	$27,600	1	1995
Pleasant Valley S D	$9,434	29	610	660	690	$26,500	2	1995
MSA Wide Data	$9,338.	178	610	640	680	$27,000	2	1995
North Pocono S D	$11,002	8	615	635	680	$27,707	1	1994
Scranton City S D	$7,350	5	.	630	.	$33,400	3	1996
Pocono Mountain S D	$9,936	36	605	625	660	$26,800	2	1993
Hazleton Area S D	$8,984	10	590	620	710	$29,725	1	1996
Dallas S D	$13,934	2	.	620	.	$27,279	2	1995
Pittston Area S D	$8,894	3	.	620	.	$31,225	6	1996
Tunkhannock Area S D	$9,178	2	.	605	.	$29,989	1	1995
Berwick Area S D	$9,170	6	580	600	610	$18,500	1	1994
Dunmore S D	$10,092	2	.	580	.	$29,209	1	1994
Valley View S D	$9,338	3	.	570	.	$26,202	1	1996
Philadelphia MSA								
Upper Merion AREA S D	$16,094	3	.	710	.	$33,100	4	1992
Unionville-Chadds FORD	$22,484	12	655	690	710	$31,418	1	1995
Haverford Twp S D	$16,740	21	650	690	710	$30,600	1	1994
Central Bucks S D	$17,408	2	.	685	.	$32,930	1	1993
Upper Moreland TWP S D	$13,316	10	630	685	700	$28,375	2	1993
Wallingfrd Swarthmore S D	$20,644	8	670	685	700	$30,762	2	1995
Council Rock S D	$18,664	5	.	680	.	$34,500	2	1993
Quakertown Comm S D	$12,206	15	630	680	690	$33,590	1	1994
Owen J Roberts S D	$15,494	14	650	680	680	$31,442	1	1993
Phoenixville Area S D	$16,152	14	610	675	710	$32,100	1	1994
Neshaminy S D	$12,830	16	590	675	695	$28,817	1	1993
Perkiomen Valley S D	$11,810	22	630	675	690	$29,705	1	1995
Avon Grove S D	$13,206	14	660	675	690	$30,000	3	1996
Pennridge S D	$12,778	3	.	670	.	$30,178	1	1996
Lower Merion S D	$36,400	29	650	670	710	$33,400	2	1994
Southeast Delco S D	$8,738	8	640	670	710	$29,308	1	1995
Jenkintown S D	$19,972	2	.	670	.	$30,660	2	1995
Great Valley S D	$22,964	11	630	670	690	$31,048	1	1995
Octorara Area S D	$11,186	9	630	670	690	$28,500	1	1993
West Chester AREA S D	$16,856	26	640	670	690	$32,900	1	1993
Penn-Delco S D	$13,276	7	650	670	690	$27,500	2	1996
Radnor Township S D	$24,840	9	650	670	690	$33,275	2	1993
Norristown Area S D	$14,236	24	625	670	685	$26,000	1	1995
Lower Moreland TWP S D	$27,232	3	.	670	.	$28,373	1	1992
Downingtown Area S D	$17,020	18	630	665	710	$29,175	2	1994
Springfield Twp S D	$25,120	9	630	660	730	$30,608	4	1995
Coatesville Area S D	$10,478	29	630	660	720	$30,000	1	1995
Cheltenham Twp S D	$19,828	19	620	660	700	$31,000	2	1993
Rose Tree MEDIA S D	$17,464	10	600	655	700	$30,250	2	1993
William Penn S D	$8,716	8	615	655	695	$30,520	3	1996
Souderton Area S D	$15,054	10	650	655	690	$31,305	1	1995

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MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Centennial S D	$13,414	8	645	655	685	$30,508	2	1993
Kennett Consolidatd S D	$15,764	27	620	650	700	$28,800	2	1993
Bristol Township S D	$9,996	62	620	650	670	$32,071	1	1995
Tredyffrin-Easttown S D	$28,292	17	600	650	670	$33,250	4	1996
Ridley S D	$10,780	14	620	650	670	$28,600	1	1993
Upper Darby S D	$10,526	32	605	645	695	$31,240	1	1995
Pennsbury S D	$15,090	14	610	645	690	$36,175	3	1996
Upper Dublin S D	$21,612	14	630	645	670	$31,000	1	1994
Hatboro-Horsham S D	$15,000	8	615	645	660	$33,056	1	1994
Oxford Area S D	$9,568	9	610	640	690	$26,543	3	1993
Methacton S D	$14,646	17	610	640	680	$31,204	2	1995
MSA Wide Data	$15,027	2243	600	640	670	$27,841	1	1994
Colonial S D	$16,584	19	600	640	670	$32,134	1	1994
Marple Newtown S D	$18,680	11	590	640	670	$31,005	1	1995
Wissahickon S D	$20,576	26	610	640	660	$33,966	1	1994
Bristol Boro S D	$8,924	2	.	640	.	$31,390	1	1995
Interboro S D	$10,100	2	.	635	.	$32,352	1	1996
Abington S D	$17,608	27	580	630	680	$29,721	1	1993
Pottsgrove S D	$12,662	6	590	630	670	$30,768	1	1995
Garnet Valley S D	$15,300	9	610	630	670	$32,650	1	1995
North Penn S D	$15,760	52	610	630	665	$33,500	1	1995
Chester-Upland S D	$5,304	49	590	620	670	$25,402	1	1995
Philadelphia City S D	$6,842	1377	590	620	660	$27,316	1	1994
Chichester S D	$9,818	6	600	620	650	$27,045	1	1993
Pottstown S D	$10,008	4	.	615	.	$32,909	1	1994
Bensalem Township S D	$11,540	3	.	610	.	$32,152	1	1995
Pittsburgh MSA								
Quaker Valley S D	$26,836	6	650	705	710	$34,865	2	1995
Shaler Area S D	$11,354	7	670	700	710	$30,210	3	1996
Peters Township S D	$20,464	4	.	690	.	$26,000	3	1995
Burrell S D	$10,596	2	.	690	.	$24,150	1	1993
Ligonier Valley S D	$12,388	2	.	685	.	.	3	1995
Connellsville Area S D	$6,643	4	.	685	.	$18,500	2	1996
North Allegheny S D	$19,064	16	630	680	705	$35,151	2	1992
Pittsburgh S D	$8,472	80	640	680	700	$29,700	2	1993
Pine-Richland S D	$14,824	9	650	680	690	$30,150	4	1994
Mount Lebanon S D	$23,020	3	.	680	.	$34,554	2	1993
South Allegheny S D	$7,276	12	670	680	690	$27,155	1	1994
Hempfield Area S D	$11,062	11	640	680	690	$30,950	1	1996
Plum Borough S D	$11,814	4	.	675	.	$26,500	2	1996
Greater Latrobe S D	$10,914	7	650	670	720	$27,200	1	1996
Franklin Regional S D	$16,020	7	650	670	710	$26,541	2	1993
Riverview S D	$11,372	7	590	670	700	$28,440	1	1994
Greensburg Salem S D	$10,280	3	.	670	.	$28,867	1	1993
Mcguffey S D	$8,548	2	.	665	.	$25,984	1	1994
West Mifflin AREA S D	$8,708	4	.	665	.	$28,468	1	1994
Upper St CLAIR TWP S D	$28,108	3	.	660	.	$30,850	1	1993
Norwin S D	$10,560	9	640	660	700	$28,050	1	1996
Washington S D	$8,238	5	.	660	.	$26,766	1	1993
Avonworth S D	$12,244	6	640	660	670	$18,500	1	1993
Elizabeth Forward S D	$10,268	3	.	660	.	$28,050	2	1995
Bethlehem-Center S D	$6,621	4	.	655	.	$27,600	1	1994
Fox Chapel AREA S D	$26,124	19	640	650	720	$32,534	2	1994
Clairton City S D	$5,858	3	.	650	.	$28,981	2	1995
Canon Mcmillan S D	$9,886	9	640	650	700	$27,150	2	1995
Gateway S D	$12,642	3	.	650	.	$33,539	2	1996
Brentwood Boro S D	$11,262	3	.	650	.	$24,937	2	1995
Yough S D	$8,031	3	.	650	.	$24,679	2	1995
MSA Wide Data	$9,843	452	620	650	690	$28,100	1	1994
Baldwin Whitehall S D	$11,422	3	.	650	.	$33,000	1	1993
New Kensingtn-ARNOLD SD	$8,456	9	600	650	680	$26,428	1	1994
Bethel Park S D	$13,612	23	600	640	680	$25,500	1	1993
Moon Area S D	$14,440	9	620	640	680	$33,225	1	1994
North Hills S D	$13,360	6	610	640	680	$26,500	1	1995
Belle Vernon AREA S D	$8,324	5	.	640	.	$26,693	1	1993
Kiski Area S D	$9,054	6	630	640	670	$34,357	1	1996
Monessen City S D	$6,314	5	.	640	.	$23,550	1	1994
Ringgold S D	$8,300	2	.	635	.	$28,100	2	1993
Mckeesport Area S D	$6,825	6	610	630	660	$27,000	1	1995
Mount Pleasant AREA S D	$8,274	3	.	620	.	$25,870	1	1993
Hampton Township S D	$17,040	5	.	620	.	$22,150	1	1993
Woodland Hills S D	$10,126	12	590	615	670	$32,050	1	1996
Bentworth S D	$7,769	2	.	615	.	$24,423	1	1993
Penn Hills S D	$10,514	28	590	615	650	$20,608	1	1995
Penn-Trafford S D	$11,240	22	570	615	650	$25,787	1	1995

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MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
West Jefferson HILLS SD	$12,506	4	.	615	.	$28,633	1	1995
Trinity Area S D	$10,464	2	.	610	.	$25,725	1	1993
West Allegheny S D	$11,004	5	.	610	.	$28,825	2	1995
Chartiers-Houston S D	$9,262	6	600	605	630	$19,500	2	1995
Duquesne City S D	$4,681	3	.	600	.	$29,660	1	1996
Highlands S D	$9,184	4	.	600	.	$29,050	1	1996
Cornell S D	$8,076	2	.	595	.	$26,896	1	1994
Steel Valley S D	$7,815	3	.	590	.	$24,559	1	1995
East Allegheny S D	$7,723	3	.	590	.	$26,088	1	1996
Derry Area S D	$8,308	2	.	590	.	$24,003	1	1993
California A S O	$6,241	2	.	575	.	$26,230	2	1993
Reading MSA								
Tulpehocken Area S D	$10,716	2	.	705	.	$30,679	3	1996
Muhlengerg S D	$12,562	9	650	690	720	$33,029	2	1995
Governor Mifflin S D	$14,596	10	650	690	700	$30,121	2	1994
Schuylkill Valley S D	$12,808	2	.	685	.	$30,491	1	1994
Wilson S D	$12,652	5	.	680	.	$27,500	2	1993
Fleetwood Area S D	$13,408	15	650	680	710	$30,375	1	1995
Oley Valley S D	$12,934	7	660	680	700	$18,500	1	1995
Kutztown Area S D	$9,330	5	.	680	.	$34,500	2	1995
MSA Wide Data	$12,607	150	630	670	700	$28,596	1	1994
Conrad Weiser A S D	$12,106	7	650	660	710	$33,700	1	1995
Boyertown Area S D	$13,244	9	640	660	690	$31,482	1	1994
Hamburg Area S D	$11,176	8	610	660	680	$28,160	1	1995
Reading S D	$8,134	42	610	650	690	$27,300	1	1993
Exeter Township S D	$14,620	3	.	630	.	$28,642	1	1993
Daniel Boone AREA S D	$13,096	13	620	630	660	$24,000	1	1995
Twin Valley S D	$10,992	9	610	620	690	$31,792	1	1995
Brandywine Hgts AREA SD	$11,898	3	.	610	.	$29,600	1	1993
Sharon MSA								
Grove City AREA S D	$8,278	2	.	710	.	$28,155	1	1994
Reynolds S D	$7,451	6	670	680	690	$26,574	2	1996
Hermitage S D	$10,300	4	.	670	.	$26,671	1	1993
Sharpsville Area S D	$9,492	4	.	670	.	$28,411	3	1994
Greenville Area S D	$9,728	7	630	660	700	$29,871	2	1995
MSA Wide Data	$8,274	43	620	660	690	$28,411	1	1995
Lakeview S D	$7,829	3	.	640	.	$31,013	1	1996
Mercer Area S D	$8,572	2	.	640	.	$27,000	1	1994
Commodore Perry S D	$8,270	2	.	640	.	$29,967	1	1995
Farrell Area S D	$5,572	6	620	635	670	$30,387	1	1995
Sharon City S D	$7,351	6	610	630	680	$27,700	1	1994
State College MSA								
State College AREA S D	$9,504	12	680	710	725	$27,026	2	1995
Penns Valley AREA S D	$9,368	6	630	705	710	$25,500	1	1993
MSA Wide Data	$9,277	26	670	700	710	$26,905	1	1994
Bald Eagle AREA S D	$8,636	2	.	695	.	$27,150	1	1995
Bellefonte Area S D	$9,186	6	670	680	710	$24,284	1	1994
Williamsport MSA								
Montoursville Area S D	$10,096	10	620	690	710	$30,971	1	1994
Muncy S D	$11,014	2	.	660	.	$29,825	1	1995
Loyalsock Township	$12,646	4	.	655	.	$30,677	1	1994
MSA Wide Data	$9,774	24	590	645	695	$30,567	1	1994
South Williamsport A SD	$9,452	4	.	635	.	$29,233	1	1996
East Lycoming S D	$11,012	2	.	625	.	$29,250	1	1994
York MSA								
Central York S D	$16,548	14	650	695	710	$26,309	2	1993
Southern York CO S D	$12,848	8	645	690	710	$27,950	3	1995
West York AREA S D	$12,422	28	645	670	710	$26,166	1	1994
Dover Area S D	$12,318	15	660	670	690	$26,509	1	1994
South Western S D	$12,120	15	630	670	690	$26,043	2	1993
Littlestown Area S D	$10,440	9	660	670	680	$25,339	1	1994
Hanover Public S D	$12,420	6	630	670	680	$27,036	1	1994
Fairfield Area S D	$10,638	6	640	665	700	$28,978	1	1995
Red Lion AREA S D	$11,816	11	640	660	710	$25,618	2	1992
Bermudian Springs S D	$11,360	7	640	660	690	$25,000	1	1993
South Eastern S D	$10,420	11	610	660	690	$28,427	1	1995
MSA Wide Data	$12,120	239	630	660	690	$26,594	1	1994
Northeastern York CO SD	$11,138	9	650	660	680	$27,000	1	1996
Spring Grove AREA S D	$12,976	12	655	660	680	$26,033	2	1994
Conewago Valley S D	$11,428	5	.	660	.	$25,846	6	1995
Gettysburg Area S D	$9,500	10	620	655	690	$26,623	1	1995

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MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Dallastown Area S D	$15,084	10	640	655	680	$28,883	1	1995
York Suburban S D	$18,716	8	640	655	675	$28,358	3	1994
York City S D	$7,494	38	610	650	680	$27,962	1	1995
Eastern York S D	$12,626	13	630	650	670	$26,584	2	1995
Northern York CO S D	$12,676	2	.	630	.	.	2	1996
Upper Adams S D	$9,642	2	.	585	.	$29,646	1	1996
Beaver MSA								
South Side AREA S D	$9,084	3	.	680	.	$28,211	1	1993
Beaver Area S D	$11,780	7	640	670	690	$27,875	1	1994
New Brighton AREA S D	$7,063	12	600	650	685	$25,084	1	1993
Blackhawk S D	$10,212	3	.	640	.	$21,000	1	1993
MSA Wide Data	$8,154	68	610	640	670	$28,296	1	1994
Aliquippa Borough S D	$5,444	12	615	635	660	$28,402	1	1995
Big Beaver FALLS A S D	$5,776	8	600	630	695	$30,094	1	1995
Rochester Area S D	$7,369	5	.	630	.	$27,548	1	1993
Freedom Area S D	$8,222	2	.	630	.	$26,005	1	1993
Riverside Beaver CO S D	$7,623	3	.	610	.	$27,252	1	1996
Western Beaver CO S D	$8,142	2	.	605	.	$28,084	1	1994
Hopewell Area S D	$9,352	2	.	595	.	$31,595	1	1996
NonMSA MSA								
Shikellamy S D	$9,366	2	.	725	.	$28,300	1	1993
Lewisburg Area S D	$10,070	3	.	720	.	$27,025	1	1993
Tri-Valley S D	$8,926	2	.	700	.	$25,000	1	1993
Titusville Area S D	$8,065	3	.	700	.	$27,370	1	1993
Oswayo Valley S D	$6,354	2	.	695	.	$23,082	1	1994
Milton Area S D	$9,266	2	.	690	.	$30,447	1	1995
Franklin Area S D	$8,306	2	.	690	.	$25,188	1	1994
Philipsburg-Osceola ASD	$7,521	2	.	690	.	$24,000	1	1995
Central Greene S D	$7,143	3	.	690	.	$21,200	2	1996
Clearfield Area S D	$8,928	2	.	690	.	$24,000	1	1995
Western Wayne S D	$8,096	3	.	690	.	$26,666	1	1994
Fannett Metal S D	$7,574	2	.	685	.	$24,010	2	1994
Danville Area S D	$11,300	8	640	680	705	$30,634	1	1995
Armstrong S D	$7,949	2	.	680	.	$24,000	1	1992
Bradford Area S D	$8,430	8	640	675	700	$28,191	1	1995
Penncrest S D	$8,508	4	.	675	.	$26,271	1	1993
Southern Fulton S D	$7,311	2	.	675	.	$29,180	1	1995
Juniata County S D	$8,884	4	.	670	.	$25,000	1	1994
West Greene S D	$5,958	4	.	670	.	$27,838	1	1995
Coudersport Area S D	$9,700	5	.	670	.	$24,215	2	1993
Harmony S D	$5,822	5	.	670	.	$18,500	1	1993
Huntingdon Area S D	$7,416	5	.	670	.	$25,263	1	1994
Slippery Rock A S D	$7,074	3	.	670	.	$28,490	1	1995
Union S D	$7,102	2	.	670	.	$22,674	1	1994
Wallenpaupack Area S D	$9,028	18	630	665	710	$25,700	2	1995
Chambersburg Area S D	$10,952	18	650	665	680	$28,250	1	1995
Williams Valley S D	$8,538	3	.	660	.	$22,300	1	1995
Mars Area S D	$10,948	8	625	660	690	$30,671	1	1995
Southern Tioga S D	$8,388	4	.	660	.	$28,740	6	1993
Pine Grove AREA S D	$8,338	2	.	660	.	$23,950	1	1994
Delaware Valley S D	$9,950	16	640	660	685	$32,600	1	1995
Oil City AREA S D	$8,812	5	.	660	.	$30,000	1	1996
West Branch AREA S D	$7,218	4	.	660	.	$26,399	1	1995
Forest City REGN S D	$8,468	3	.	660	.	$33,964	2	1995
Warren County S D	$9,738	14	610	660	670	$24,000	1	1995
Cameron College S D	$8,656	2	.	650	.	$27,563	3	1994
Butler Area S D	$10,440	15	630	650	700	$27,800	1	1994
Marion Center AREA S D	$6,950	2	.	650	.	$29,395	1	1995
Seneca Valley S D	$11,676	23	630	650	680	$32,590	2	1995
MSA Wide Data	$8,108	377	610	650	680	$27,200	1	1994
Cranberry Area S D	$7,885	2	.	650	.	$26,300	1	1995
Bedford Area S D	$7,841	3	.	650	.	$25,421	1	1993
Waynesboro Area S D	$9,536	6	640	650	660	$25,188	1	1993
Moniteau S D	$7,668	4	.	645	.	$28,403	2	1995
Northern Tioga S D	$6,950	9	590	640	710	$24,774	1	1993
Troy Area S D	$7,402	4	.	640	.	$31,000	1	1996
Towanda Area S D	$9,832	4	.	635	.	$28,970	1	1995
Central Fulton S D	$9,156	4	.	635	.	$26,110	1	1994
Kane Area S D	$8,634	3	.	630	.	$23,386	1	1993
Apollo-Ridge S D	$7,986	3	.	630	.	$18,500	2	1996
Punxsutawney Area S D	$7,558	2	.	630	.	$28,100	2	1995
Karns City AREA S D	$8,554	7	620	630	640	$21,621	1	1993
Wilmington Area S D	$8,119	2	.	630	.	$30,500	2	1996
Midd-West S D	$8,504	5	.	630	.	$26,732	1	1994

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MSA/SD	1989 Income Per capita	No. Hires 1987-96	Q1 NTE El Score	Med NTE El Score	Q3 NTE El Score	Mean Salary	Median Serv Yrs	Med Year of Hire
Sayre Area S D	$9,936	3	.	630	.	$30,030	1	1996
Blue Mountain S D	$12,098	6	570	630	640	$25,500	2	1994
Port Allegany S D	$7,887	2	.	625	.	$29,911	4	1995
Wayne Highlands S D	$9,308	5	.	620	.	$24,825	1	1993
Greencastle-Antrim S D	$11,094	4	.	620	.	$31,584	1	1995
New Castle AREA S D	$6,354	6	590	620	650	$31,719	1	1996
Mifflin County S D	$8,087	2	.	620	.	$31,864	1	1996
St Marys AREA S D	$11,032	3	.	610	.	$26,420	1	1995
South Butler CO S D	$11,042	3	.	610	.	$26,684	1	1993
Union Area S D	$8,314	3	.	610	.	$27,200	1	1996
Blue Ridge S D	$8,360	2	.	610	.	$26,599	1	1995
Elk Lake S D	$7,282	4	.	610	.	$26,575	1	1994
Laurel S D	$8,376	1	.	.	.	$31,694	1	1995
Mount Union AREA S D	$6,185	2	.	605	.	$26,835	1	1995
Ellwood City AREA S D	$7,999	5	.	600	.	$28,050	1	1993
Canton Area S D	$7,448	3	.	600	.	$27,700	1	1994
Chestnut Ridge S D	$6,450	3	.	600	.	$28,525	2	1994
Ridgway Area S D	$8,752	3	.	600	.	$24,500	1	1994
Mahanoy Area S D	$6,529	2	.	600	.	$18,500	1	1993
Neshannock Twp S D	$14,802	2	.	595	.	$28,975	2	1993
Mifflinburg Area S D	$8,742	7	590	590	620	$27,676	1	1994
Keystone Central S D	$7,817	2	.	575	.	$32,788	1	1996

Source: Analysis of NTE and Prof. Pers. files.

Chapter 8

Employment Procedures and Practices in Pennsylvania

8.1 Major Features of Teacher Employment Survey

In conjunction with the analysis of historical administrative records of the Pennsylvania Department of Education, a survey eliciting the characteristics of classroom teacher recruitment and hiring procedures and experience in 1997 was devised and administered to all 501 school districts in Pennsylvania. Three stake holders were surveyed with the identical survey instrument: School Superintendents, School Board Presidents, and Teacher Union Presidents.

The following major points emerge:

1. 85% of the districts reported that their collective bargaining agreements required advertising within the district of new positions, but only 27% stipulate that interested internal staff be interviewed;

2. While in 86% of the districts the local teachers' association does not play a formal role in the interviewing process, in 65% of the districts it plays an informal role;

3. About 1/3 of the districts fill full-time openings from substitutes or part-time teachers whom they already know, 14% of full time positions are filled from internal transfers within the district;

4. About 40% of current teachers in the district obtained their high school diploma or attended high school in the district where they work;

5. Districts generally received more than five applications to each vacancy, and on average 50 elementary applications for each opening.

6. 20% of the districts reported that salary was a limiting factor in their obtaining the most desired teacher recruits;

7. 90% of the districts reported that some certification areas were easy to recruit (elementary was mentiond by 74% of the districts);

8. 78% of the districts reported that some certification areas were difficult to recruit (14% mentioned physics, 17% mentioned foreign language);

9. Only 49% of the districts have written hiring policies;

10. Only 25% of the districts advertise teaching openings outside of Pennsylvania; about 83% advertise outside their district; the major forms of local advertising are: PSBA Bulletin, word of mouth, bulletin boards in the district, education schools placement offices, and the local newspaper;

11. 52% of the districts report being contacted by a teacher preparation program regarding openings;

12. 26% of the districts reported requesting waivers from the Department of Education and 65% (of those requesting) obtained a waiver. 27% stated that a waiver was requested because applicants were not fully qualified;

13. 80% of the districts require more than the basic, state-mandated form which was put in place in Fall, 1996; written recommendations, transcripts, and a copy of the certification were requested 65-70% of the time, if anything beyond the state form was requested;

14. In about 1/3 of the districts, a non-interviewer plays a role in the hiring process;

15. The most influential factors used to narrow the paper applicant pool for subsequent interviewing are: major in area of teaching, overall grade point average and grade point average in major, past performance in teaching, and reference or recommendations;

16. Independent evidence on content knowledge and caliber of certificating institution was about as important as indications of community involvement, willingness to assist in extracurricular activities, and non-teaching work experience;

17. 44% of the districts use more than one interview team to interview applicants;

18. First and second interviews average about 40-45 minutes;

19. 94% of the districts report the building principal is present in the first interview, 34% report other teachers, and 11% report school board member(s) were present;

20. 27% of the districts report using a sample classroom presentation as part of the initial evaluation process, while 36% require a sample classroom presentation if a second interview is required;

21. The school superintendent and building principal determine in 2/3 of the districts who moves from the interview list to the narrowed applicant pool; 21% of the districts report that school board members participate in this narrowing process, and only 12% report that other teachers and 17% report that the department head participates in the narrowing process.

22. In the case of late hires, 1/3 of the positions offered were for full time, contract positions; current substitutes are first offered such positions in 28% of the cases; 83% of the districts do not use a separate personnel process for late hires;

23. Current collective bargaining agreements average four years in duration, and 38% of the districts indicate that the current agreement was reached at least one year before the expiration of the old one.

These initial results suggest, consistent with Ballou and Podgursky(1997), that less emphasis is placed on content knowledge other than what is reflected in grade point averages (but not college of preparation) than independent measures of academic preparation. Peformance on test scores is weighted, on average, as heavily as willingness to engage in extracurricular activities.

It also is clear that most districts do not actively seek new teacher applications through vigorous advertising and recruiting. The result is that a high proportion of hired teachers are simply those the district knows best, their own graduates. This finding is also consistent with a nepotism model of the hiring process for which there is anecdotal evidence, some added to our survey responses by frustrated school administrators.

8.2 Student Achievement and Aspects of the Employment Process

A question naturally arises about whether the structure and nature of the classroom teacher employment process is associated with different levels of student achievement. On the one hand, common sense suggests that the more careful districts are in selecting teachers, and the more attention paid to the academic background and achievement of teachers in the selection and employment process, the more likely it is that the district's own students will perform better on competency and achievement tests.

We present below some preliminary correlation analysis which substantiates this common sense conjecture. The 290 surveys returned by Superintendents and checked by the research project are analyzed below. Statistical weighting procedures were used to make them reflective of the universe of districts in the state; no respondent district was weighted more heavily than 4.0, and an examination of weighted and unweighted results show broad agreement on the statistical patterns reported below.[1]

The first school district outcome of interest is the 1991/2 post-secondary plans of high school seniors. The percentage indicating some form of further education is viewed as an outcome valued by parents and students. District level, weighted average achievement scores on the 1995/6 PSSA are the other measure of school district outcomes: mean math and reading scores for 5th, 8th and 11th grades are measures of student achievement.

Table 8.1 displays the simple corelation between responses to selected questions from the survey and these measures of student performance. Recall that a correlation coefficient varies in value between -1.0 and +1.0; also, we can test statistically for whether or not the correlation is due to randomness or displays a reliable indication of association. Generally, any probability of a correlation due to possible randomness less than .05 is considered highly reliable. The first row of the correlation table indicates the Survey question number;[2] to the right is the correlation with the measure of student performance. The second row, with the actual question, indicates the odds of the correlation being due to just randomness. For example, the first survey question analyzed in Table 8.1 is whether or not late hires were offered full time contract positions. The value -.08992 indicates that the more often this was reported, the lower the 5th grade average PSSA math score. This should not be interpreted as a causal statement by itself, but as a measure of association. Since the correlation is small in absolute value (.089), it is a weak association, and the value .1266 indicates that there is a 12.7% chance that the association is due to statistical error.

An easy way to locate statistically reliable results in the table is to look for probability values

[1] The data survey obtained will continue to be analyzed, and related to other school district characteristics beyond student achievement.

[2] SeeChapter 10 for the complete survey, mean and median responses.

under .05. We find, for example that offering full-time contract positions more frequently is associated with lower 8th grade mean math scores with a correlation of -.12467 and a probability of error of.0338.

If we move to Q78, however, we find more systematic and reliable results. The higher the fraction of a district's teachers that went to its own high school, then the lower **all** of its test scores are, and the lower is the fraction of high school seniors with post-secondary educational plans.

The correlation coefficients range from -.13 to -.235 across student achievement tests and the origins of the district's teachers.

Where salary schedule limited applicants in the minds of Superintendents, (Q15), student achievement was systematically lower. Here the correlations range from -.09 (and not reliable) to -.2 for post-secondary plans.

The more frequently a school district requested waivers from the Department of Education, the lower the various measures of student achievement. Correlations here range from -.12 to -.18. [3]

Districts which request information beyond the mandatory state form tend to have students who achieve more highly across all grades, and have more students with post-secondary educational plans. Correlations here range from +.168 to .25; all are highly statistically significant. Indeed, a number of the indicators of requesting further information in the initial screening process are correlated with greater student achievement: written recommendations was very highly related to student achievement. Since candidates must obtain in writing others' opinions of their skills, and the district receiving review them, this can be viewed as an indicator of how seriously the district takes the application process. Evidently, districts which make this effort also tend to have students who achieve more highly. [4]

Initial screening on the basis of overall grade point and grade point in the applicant's major is associated with greater student achievement; (Q30B and Q30C) as is past performance in teaching and references and recommendations. Dual certification and experience in teaching are not associated with higher student performance. Where districts emphasize advanced degrees, test scores, and essays in their initial screening process, 11th grade student peformance in math and reading are higher.(See Q30I, Q30J, Q30K).

Where districts emphasize community involvement and willingness to do extracurricular activities in their initial screening, there is generally no relationship to student achievement.

Where districts screen applicants on the basis of whether or not applicants are school district residents, student achievement at all grades is lower. These are some of the strongest correlations found: they range from -.20 to -.30 with errors of .0001. (See Q30P).

[3] It should be emphasized this is merely an association, and may reflect other interdependencies: inability to attract candidates, or lack of advertising to allow greater discretion in hiring than is typically permitted under the School Code.

[4] We intend to explore if these districts are larger and have more specialized staff, are better funded, or have more highly educated families.

Table 8.1: Correlations between Employment Process and PSSA Student Achievement Scores in 1995/6

Survey Question	Math 5	Math 8	Math 11	Read 5	Read 8	Read 11	% with Plans
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Q62A	-0.08992	-0.12467	-0.0627	-0.08819	-0.09274	-0.08905	-0.0374
Full time contract position	0.1266	0.0338	0.2872	0.1341	0.115	0.1303	0.5262
Q62B	0.0263	0.03497	-0.01446	0.04922	0.04302	-0.06455	0.01181
One year full-time Substitute	0.6555	0.5531	0.8063	0.4037	0.4655	0.2732	0.8412
Q62C	0.07206	0.08438	0.0991	0.06299	0.05976	0.02866	0.11716
Six months Substitute	0.2211	0.1518	0.0921	0.285	0.3105	0.6269	0.0462
Q62E	0.12676	0.0654	0.08345	0.05419	0.03153	0.0823	0.14372
Depends on situation	0.0309	0.267	0.1564	0.3578	0.5928	0.1621	0.0143
Q78	-0.23504	-0.15279	-0.1562	-0.18227	-0.18512	-0.13145	-0.1309
% who went to high school in SD	0.0006	0.0261	0.0229	0.0078	0.0069	0.056	0.0571
XQ81	0.0284	0.03758	0.03544	0.04241	0.06403	0.04067	0.10849
Written hiring procedures?	0.6517	0.5502	0.5733	0.5001	0.3084	0.518	0.0838
XQ7	0.07	0.04172	0.03944	0.05651	0.07009	0.04621	0.04458
SD advertise outside of PA?	0.2363	0.4807	0.5049	0.3392	0.2357	0.4347	0.4511
XQ8	0.06408	0.03028	0.02397	0.04479	0.00659	0.01852	-0.0386
Often advertise outside SD?	0.2768	0.6076	0.6844	0.4474	0.9111	0.7535	0.5122
XQ10	0.05016	0.07098	0.04823	-0.00591	0.08029	0.07626	0.04341
SD has partnership program	0.3981	0.2314	0.4165	0.9207	0.1757	0.1985	0.4646
XQ11	0.00448	0.00762	-0.00601	0.01895	0.00756	-0.01461	0.06976
SD contacted by tch prep pgm?	0.9395	0.8972	0.9188	0.7479	0.8981	0.8044	0.2363
XQ15	-0.17097	-0.19199	-0.1454	-0.13784	-0.20008	-0.09635	-0.1635
Salary schedule limited applicants?	0.0086	0.0031	0.0258	0.0347	0.0021	0.1409	0.0121
XQ16	-0.12292	-0.16743	-0.18	-0.1563	-0.17158	-0.15207	-0.1215
SD request a waiver from PDE?	0.0622	0.0108	0.0061	0.0174	0.009	0.0208	0.0653
XQ21	0.16789	0.25181	0.23735	0.1889	0.22872	0.17447	0.20077
Ask info beyond mandatory PA?	0.0042	0.0001	0.0001	0.0013	0.0001	0.0029	0.0006
Q21A	0.12925	0.13183	0.10828	0.10311	0.10966	0.03233	0.07676
SD extra info: NTE exam scores	0.0278	0.0248	0.0656	0.0796	0.0622	0.5835	0.1924
Q21B	0.094	0.07536	0.0397	0.05734	0.05896	-0.01523	0.09968
SD extra info: Praxis scores	0.1102	0.2007	0.5007	0.3305	0.317	0.7963	0.0902
Q21C	0.21329	0.26707	0.28104	0.21767	0.26249	0.21692	0.18019
SD extra info: Written recommend	0.0003	0.0001	0.0001	0.0002	0.0001	0.0002	0.0021
Q30A	-0.00471	0.01373	0.05764	0.02499	0.01031	0.11742	0.0089
Experience	0.9365	0.8162	0.3288	0.6723	0.8615	0.0461	0.8803
Q30B	0.20701	0.17987	0.1952	0.17038	0.15971	0.16807	0.12598
Grade point average overall	0.0004	0.0021	0.0008	0.0037	0.0065	0.0042	0.0323
Q30C	0.19319	0.16322	0.20174	0.17192	0.14981	0.18189	0.14885
Grade point average in major	0.001	0.0054	0.0006	0.0034	0.0108	0.0019	0.0113
Q30D	-0.05967	-0.04967	-0.01743	-0.08647	-0.08601	0.07301	0.01289
Dual certification	0.3121	0.4002	0.7679	0.1425	0.1447	0.2159	0.8273
Q30E	0.10166	0.14161	0.13371	0.11022	0.12694	0.13975	0.01132
Past performance in teaching	0.0845	0.016	0.023	0.0613	0.031	0.0174	0.848
Q30F	0.12104	0.09878	0.13475	0.15308	0.08137	0.13142	0.00088
References/Recommendations	0.0398	0.0937	0.0219	0.0091	0.1677	0.0255	0.9882
Q30G	0.02435	0.07303	0.08308	0.04542	0.04531	0.11967	0.02514
Major in area of teaching	0.6801	0.2158	0.1589	0.4418	0.4428	0.0421	0.6704
Q30H	0.10771	0.10476	0.07989	0.08132	0.07605	0.04739	0.07115
Caliber of certificating instit.	0.0675	0.0754	0.1756	0.168	0.1974	0.4222	0.2279
Q30I	0.10657	0.09746	0.11213	0.07024	0.05533	0.11695	0.09582

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Survey Question	Math 5	Math 8	Math 11	Read 5	Read 8	Read 11	% with Plans
Advanced degrees	0.0705	0.0982	0.0569	0.2339	0.3487	0.047	0.104
Q30J	0.2088	0.1458	0.17154	0.21037	0.14886	0.19751	0.04253
Essay(s)	0.0004	0.0131	0.0034	0.0003	0.0113	0.0007	0.4714
Q30K	0.1077	0.02897	0.11031	0.08373	0.02196	0.12816	-0.0085
Test scores	0.0675	0.6238	0.0611	0.1557	0.7101	0.0294	0.8855
Q30L	0.00747	0	0.03952	0.02344	0.00431	0.06247	0.06033
Community involvement/leadership	0.8994	0.9999	0.5033	0.6915	0.9419	0.2898	0.3067
Q30M	-0.04139	-0.07738	-0.05664	-0.04778	-0.08647	-0.03953	-0.0087
Willingness to do extracurricula	0.4834	0.1896	0.3373	0.4184	0.1425	0.5033	0.8827
Q30N	0.09943	0.05548	0.08144	0.06973	0.07538	0.10911	0.09636
Contributes to Staff Diversity	0.0916	0.3473	0.1674	0.2373	0.2014	0.064	0.1021
Q30O	0.05685	0.04488	0.0621	0.05578	0.04023	0.11262	0.04313
Non-teaching work experience	0.3355	0.4472	0.2927	0.3447	0.4957	0.0558	0.4652
Q30P	-0.28051	-0.28014	-0.30175	-0.2728	-0.26569	-0.20213	-0.126
School district resident	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0323
Q30Q	-0.08656	-0.07564	-0.11387	-0.06256	-0.08919	-0.07852	-0.0962
School district teacher	0.1421	0.1998	0.0531	0.2892	0.1304	0.1831	0.1028
XQ32	0.10345	0.14588	0.08576	0.13657	0.12063	0.03872	0.06969
More than one interview team?	0.0829	0.0142	0.1509	0.0218	0.043	0.5172	0.2434
XQ37	-0.14174	-0.12425	-0.09354	-0.14101	-0.10929	-0.06025	-0.0983
Did noninterviewer affect hiring	0.017	0.0367	0.1164	0.0176	0.0664	0.3125	0.0988
XQ41	0.24427	0.25533	0.24053	0.25843	0.22974	0.1788	0.1544
How often - second interview ?	0.0001	0.0001	0.0001	0.0001	0.0001	0.0026	0.0095
XQ48	0.14113	0.11719	0.1024	0.09977	0.11011	0.08045	0.15396
Sample class for evaluation ?	0.0199	0.0535	0.0919	0.1006	0.0698	0.1859	0.011
XQ66	-0.0378	-0.04907	-0.09304	-0.02821	-0.01419	-0.09947	0.05106
When is current sub. 1st offered	0.5456	0.4325	0.1361	0.6519	0.8205	0.111	0.4141
Q79	0.17598	0.25845	0.20493	0.19389	0.22894	0.15041	0.147
Pct of teachers w/ Master degrees?	0.005	0.0001	0.001	0.0019	0.0002	0.0167	0.0193

Note: 2nd line is odds of correlation due to error.

8.3 Further Evidence on Excess Supply

The above summary of survey responses shows there were more applications for teaching positions than positions available, yet many districts also reported difficulties in recruiting in some certification areas. Table 8.2 looks at the *distribution* among districts of the ratio of applications to positions. The analysis examines the ratio of applications to positions, ordered from smallest to largest ratio.

In elementary education, there were 239 districts that were hiring and the first quartile of the ratio of applications to positions was 22. The median district has 50 applications; one district had 1,176 applications for each position. Double digit applications to positions available ratios are evident also in mathematics, English and social studies. In the sciences and languages, the application ratio is small and in the 3-10 range for the 25th percentile, which may imply that there may not have been sufficient interest to find the particular specialty.

Table 8.2: 1997 Ratio of Applications to Positions by Certification Area in Pennsylvania School Districts

(1)	(2)	(3)	(4)	(5)	(6)
	Q1	Median	Q3	Max	N Dist
Elementary	22	50	100	1176	239
Math	10	20	43	300	99
English	12	25	48	415	118
Soc Studies	20	35	70	400	94
Biology	9	15	28	100	43
Chemistry	3	7	17	225	58
Physics	3	5	10	28	39
Gen Science	8	12	26	125	51
French	3	6	10	20	20
Spanish	4	8	12	50	49
Art	8	12	20	300	45
Music	7	12	22	168	55

Source: Analysis of Employment Survey.

Chapter 9

Implications for Public Education in Pennsylvania

9.1 Practices and Trends in Other States

The review of teacher preparation, certification, and program approval in other states indicates a wide variety of practices. States generally require prospective teachers to be of good moral character, have a college degree of some sort, and pass either state-devised or nationally marketed proprietary examinations.

Of the states closely examined, only Connecticut has state-imposed admissions standards (1000 or more of combined SAT scores). In some states, there is anecdotal evidence that individual institutions require minimum test scores to be admitted to teacher preparation programs.

There appear to be major differences among the states in the specificity of their requirements on both the course work which teachers must complete to be certified to teach in an area, and the obligations on the institution. Over the past several years there has been increasing national interest in ensuring that prospective teachers have college majors in the area which they intend to teach, and studies of assignment of all the states; *Education Week* recently indicated that Pennsylvania had 14% of its teachers teaching in areas for which they did not have a college major. This was by no means high among the figures reported. [1]. However, common sense indicates that simply completing a college major in history or mathematics with some reasonable degree of proficiency is not sufficient to guarantee that content knowledge levels are adequate for today's curricula, or the more demanding curricula needed to make our students more competitive internationally. Colleges and universities vary enormously in the extent and quality of offerings in history and mathematics; it has been beyond the scope of this study to review each of Pennsylvania's program approval standards, and compare them with other states' standards. Indeed, it was extremely difficult to obtain this information. The project was able to obtain Connecticut's program approval standards, and they are reproduced in Chapter 11 as an example of requirements which are both quite specific and measurable. The reader will find repeated obligations on certificating institutions, and by way of implication, the state supervising agency, to report on the "evidences" which indicate compliance with the standards.

Another difference among the states, and closely related to the issue of whether a college major is required or not, is whether obtaining a degree in professional education is acceptable or not. As indicated, 11 states, including several of Pennsylvania's neighbors (New York and New Jersey), do not solely accept professional education degrees for certification purposes. Through their reciprocity of certification in other states, some sort of accommodation is available. The

[1] See: *What Matters Most: Teaching for America's Future*. Report of the National Commission on Teaching and America's Future, September, 1996; *Education Week*. (1997). *Quality Counts*. January 22, 1997, Vol XVI; *Education Week* (1998). *Quality Counts*. January 8, 1998, Vol XVII.

point is that prospective teachers in these states must not only take education courses dealing with pedagogy and perhaps child development, they must also take specialty courses that constitute a subject matter major. Whether these courses are in schools of education or in colleges of arts and sciences matters both in terms of the breadth of the major as well as the depth of the subject matter course work.

Common sense suggests that requiring a college major in the academic department will not only ensure greater content knowledge for the prospective teacher in that area, but also foster that individual's longer term interest in keeping abreast of the subject matter. That is, it is more likely that taking more courses about history will create a life-long interest in the study of history, than merely taking courses about how to teach history in the classroom. Maintaining a life-long interest in one's teaching subject would seem vitally important for subsequent, effective professional development.

Arguably any shortfall in the content knowledge preparation *requirements* by the states could be overcome by demanding subsequent content-knowledge updating through professional development. However, professional development typically has not involved, in any of the states examined, both re-evaluation of base-line content knowledge of experienced (and tenured) classroom teachers and further college level coursework in the actual teaching areas of these experienced teachers. Whether or not proper incentives can be structured to ensure meaningful professional development, as states pursue more ambitious curricula and high stakes testing for the students, remains an outstanding issue for public education. Also, whether or not financial incentives will be sufficient to ensure upgraded content knowledge and pedagogical skills remains an unanswered question, especially in light of the historically low content knowledge requirements in Pennsylvania.

Arguably, the level at which the passing scores are set during the initial certification process may well militate against strongly enforcing quality control post-baccalaureate. Moreover, one can reasonably ask whether validation is being properly accomplished since it is currently based on review by other teachers rather than on the educational achievement of teachers' students.

To be sure, this is a more difficult task, but given its importance, something one would expect the national testing services or a lead state to pay attention to. On the other hand, there is evidence, noted in Chapter 3 that higher NTE scores in specialty areas are associated with higher student achievement.

One of the more interesting aspects of the detailed review of selected states was California's statutory requirement that educational preparation institutions publicly state in their published catalogue their placement rate, so that applicants and students are informed of their employment prospects. Given Pennsylvania's large imbalance between production of new teaching certificate holders and their employment, this sort of public information would undoubtedly improve career planning.

9.2 Comparisons with Pennsylvania and Summary of Data

The empirical and legal analysis lead to the following stylized facts:

1. Teacher certification requirements are particularly modest in Pennsylvania.[2] A college subject matter major is not required for certification, and program approval is not based on well-

[2] As this *Report* was being completed, and in part due to it, Pennsylvania has embarked on a program of addressing certain issues of teacher certification.

defined curricula or stringent state oversight.[3]

2. Pennsylvania's teacher force is aging, and simulation analysis suggests that as many as 50,000 hires may be needed to replace retirements by 2006; Chapter 5, Tables 5.16-5.25 detail by certification area and Metropolitan Statistical Area future teaching needs.

3. Many more teachers have been trained inside Pennsylvania than have been hired; both comparisons of the state's administrative records on teacher certifications and responses to the employment survey show that there are many applicants for each opening, although there are differences among certification areas;

4. There is wide variation in the content knowledge test scores among Pennsylvania's teacher preparation institutions. Given that passing scores are quite low, around the 10th or 20th percentile, often representing a very low fraction of correct, weighted scores, this means that there is a large pool of highly variable quality teaching candidates from which districts make employment decisions. Other professions, notably accounting and law, have much higher passing scores so that only 50 to 60% of those tested are certified to practice in these other professions.

   Generally, the standardized test scores are highest for Pennsylvania's private college and university prospective teachers; however, some state system institutions scores in some specialty areas are high. The wide variation in scores undoubtedly reflects widely varying admissions requirements, as well as the degree of rigor in the particular programs;

5. Ranking of each of Pennsylvania's school districts by median test score of their elementary school teachers hired over the last 10 years shows wide variation in the selectivity of the hiring districts, or attention to content knowledge in the process. Examination of the scores, by MSA, shows very wide ranges in content knowledge levels (often 100 points on the NTE Elementary test between the most and least selective district);[4]

   There are examples of:

   - rich, high paying districts hiring high content knowledge teachers;
   - poor, moderately paying districts hiring high content knowledge teachers;
   - rich, high paying districts hiring low content knowledge teachers; and
   - poor, moderately paying districts hiring low content knowledge teachers.

6. About half of the districts lack written hiring procedures;

7. Content knowledge or subject knowledge does not seem to be central to the selection process;

8. On average, 40% of a typical Pennsylvania school district's teacher force is composed of its own high school graduates who obtained a teaching certificate;

9. There is an important, negative statistical relationship between student achievement in a school district, and emphasis in the screening process on hiring prospective teachers who are district residents;

[3] In the 1960s and 1970s when classroom enrollment grew dramatically in Pennsylvania, as well as in other states, states generally expanded their teacher preparation programs and may have loosened their program approval standards.

[4] See Chapter 7, Table 7.1.

10. Most districts spend less than two hours with teacher candidates prior to hiring them–two 40 minute interviews and perhaps one sample classroom session- given that tenure is achieved after three years, and accorded to virtually all who remain. This contrasts with the more substantial interview procedures in higher education, and the significantly longer period before tenure is achieved in higher education. Given the long-term nature and expense of a teacher, on the order of $300,000 to $500,000 on a present value basis at 4%, the hiring decision in most districts appears risky;

11. Hiring from substitute lists has become a way for 1/3 of the districts to hedge and observe prospective reachers longer before making long-term commitments; however, whether or not this obtains the highest content knowledge remains a grave question.

12. Correlation analysis reported in Chapter 8 indicates that districts which use several interview teams are also districts with higher student achievement;

13. Stronger content knowledge or subject knowledge is associated with stronger classroom achievement; this is based on studies in other states, as well as correlations of achievement and NTE scores in Pennsylvania;

14. Statutory and regulatory requirements for serving on local school boards are very modest, while the statutory and regulatory obligations on school districts in Pennsylvania are both very substantial and quite vague.

9.3 Thinking about Reform Strategies

This *Research Report* began with the observation that the public education system is complex and difficult to change, and has documented how teacher preparation and hiring practices operate, as well as likely future teacher needs, in Pennsylvania's *system* of public education.

It should be evident that improving student academic achievement is central to improving the prospects of employers expanding and/or moving to Pennsylvania to conduct business. A vigorous job market, with rising wages and salaries, depends on a labor force that is literate and numeric, and continuously able to learn. Common sense suggests that the teacher force must have the same capacities if we expect it to educate our children to these standards. Failure to improve the academic performance of our children in Pennsylvania consigns them to grim economic prospects, and ultimately a failure of government to honor its constitutional commitment to provide a "...thorough and efficient education."

Changing the way large, independent, secure, expensive, and complex institutions, with their own internal incentives and organizational goals, relate to each other is neither transparent nor easy to implement. This is especially the case given Pennsylvania's dedication to what is often enthusiastically described as "local control", or the bedrock of Jeffersonian democracy.

Incentives in much of the law governing public education in Pennsylvania encourage attention to matters far different than producing knowledgeable teachers or greater classroom achievement of students. Teaching jobs are among the highest paying, and the most coveted in many parts of the state. As a group of personnel directors told the author last year in Western Pennsyvlania, the intensity of pressure they face to hire relatives of residents seems to grow with the economic adversity the area is facing. Ironically, using this rationale for hiring instead of the content knowledge of teachers can only, in the long-run, make matters worse.

Improving classroom achievement entails not only measuring it and making students and their parents aware that it matters, but addressing the manner in which teachers are admitted, prepared, hired, tenured, and retrained as well as the curricula which they teach in relation to these standards. If one takes the state's academic standards as a starting point, then the appropriate question to ask is how each of Pennsylvania's statutes, regulations, and spending choices realistically affects the behavior of the institutions engaged in these parts of public education, and what changes can realistically be made that will lead to the achievement of these high academic standards.

Conventional reform in Michigan, New York, and Oregon has entailed the measurement of student achievement, and then subsequent dealing with the "problem" as evidence on substandard achievement accumulates. A number of states are now beginning to deal with program approval, requiring subject matter majors, mid-career training, and admission standards as a way to improve the quality of new teachers in the future.

A second way to think about reform is to think about structures which will lead to better decision-making at the school district level. Information about student achievement (or lack thereof) seems critical, as well as addressing possible self-dealing by locally elected school officials. As noted earlier, Pennsylvania's 4,500 school board directors serve voluntarily, as they do in virtually every other state.

Were local school boards to become more selective in their hiring practices viz.-a-viz. the content knowledge of their teachers, it is likely that the quality of newly hired teachers would rise quickly. Over time, this would positively affect teacher preparation programs' curriculum and admissions requirements. Of course, this can also be affected through incremental state policy.

While there are prospects for widespread retirements of the current teacher force, one should be aware that the oldest teachers may also be the most talented. For college educated women, teaching was for many years the only open professional occupation available. This occupational segregation had its beneficial effect on public education; it created a larger pool of talented women from which school boards could select. As other occupations have opened up in the last several decades, college educated women have sought other occupations. It is possible that there has been a long-term secular decline in the quality of teachers as a result, although higher real salaries in the 1980s increased the level of interest in teaching careers.

If this conjecture is correct, it suggests that the issue of retraining and effectively managing the younger, currently tenured teaching staff (say ages 34-45 now) will become an increasingly important issue as the teacher force turns over in the next decade.

This raises issues both of management and strategy. Unfortunately, the state knows very little (and school boards and superintendents even less) about its teacher force other than when each teacher received his/her certification. The above analysis of teacher test scores is unique to Pennsylvania as well as other industrial states, and represents an initial examination of content knowledge quality issues. An important, common sense issue that deserves scrutiny is the determination of the content knowledge of the current teaching force.

It should be emphasized that finding out independently what teachers currently know is not the same as administering mid-career tests and requiring their passage as a condition of relicensure. While re-examination may be controversial in public education, it is commonplace in other professions. Further more, other professions require far more meaningful continuing education obligations than does public education.

Chapter 10

Employment Survey: Questionaire and Means

Chapter 11

Connecticut Program Approval Standards

Chapter 12

Research Questions for Project

Chapter 13

Study Liason Committee's Recommendations to State Board of Education

Chapter 14

Bibliography

Ahlberg, D.A. (1982), "How Accurate are the U.S. Bureau of the Census Projections of Total Live Births?" *Journal of Forecasting*, Vol. 1, pp. 365-374.

Ahlberg, D.A. (1985), "Alternative Forecasts of U.S. School Enrollments to 2050: When will a trend bend?" *International Journal of Forecasting*, Vol. 1, pp. 37-47.

Ballou, Dale (1996). "Do Public Schools Hire the Best Applicants?" *Quarterly Journal of Economics*

Ballou, Dale and Michael Podgursky (1997a). *Teacher Pay and Teacher Quality.* (Kalamazoo, Michigan: Upjohn Institute for Employment Research, 1997)

Ballou, Dale and Michael Podgursky (1997b), "Reforming Teacher Training and Recruitment: A Critical Appraisal of the Recommendations of the National Commission on Teaching and America's future," mimeo, Department of Economics, University of Missouri, September, 24, 1997.

The BAR/BRI Group, http://www.barbri.com/

Bishop, John H. "Signaling, Incentives, and School Organization in France, the Netherlands, Britain, and the United States," in Eric A. Hanushek and Dale W. Jorgenson, (editors) *Improving Americas Schools:The Role of Incentives* (Washington, D.C.: National Academy Press, 1996).

Cagampang, Garms, Greenspan, Guthrie (1985). "Is the Reserve Pool a Realistic Source of Supply?" *Teacher Education Quarterly.* (California, Autumn 1985)

Darling-Hammond, L. and E. M. Sclan (1996), "Who Teaches and Why," in J. Siula (editor), *Handbook of Research on Teacher Education.* New York: Macmillan.

Education Week (1997). *Quality Counts.* January 22, 1997, Vol XVI.

Education Week (1997). *Quality Counts.* January 8, 1998, Vol XVI.

Educational Testing Service (1994), *The PRAXIS SERIES: Percentile Ranks and Summary Statistics, 1993/4.*(Princeton, New Jersey: ETS).

Elsbree, Willard S. (1939). *The American teacher; evolution of a profession in a democracy* (New York, Cincinnati: American Book Company)

Farkas, Steve, Jean Johnson, and Ann Duffett (1997). "Different Drummers: How Teachers of Teachers View Public Education." (Public Agenda, 1997), 16.

Ferguson, Ronald (1991). "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal of Legislation*, 28, (2), Summer, 1991, 465-98.

Ferguson, Ronald and Helen F. Ladd (1996). "How and Why Money Matters: An Analysis of Alabama Schools," in Helen F. Ladd (editor) *Holding Schools Accountable*. (Washington, D.C.: The Brookings Institution), pp. 265-299.

Freeman, R.B., and J. Leonard,"Autoregressive Degree Patterns: Evidence of Endogenous Cycles and the Market?" Industrial Realation Research Association, *Proceedings of the Thirtieth Annual Meeting* (Dec. 1977), pp.10-19.

Gold, Stephen D., David M. Smith, and Stephen B. Lawton (1995). *Public School Finance Programs of the U.S. and Canada: 1993-4.* (American Education Finance Association and The Center for the Study of the States).

Grissmer, D. G. and Kirby, S. N. (1991), *Patterns of Attrition Among Indiana Teachers*, RAND, R-4076-LE.

45-51.

Hanushek, Eric A., and Richard Pace (1995), "Understanding Entry into the Teaching Profession, " in Ronald Ehrenberg (editor) *Choices and Consequences: Contemporary Policy Issues in Education*, (Cornell University: ILR Press).

The Holmes Group (1986). "Tomorrow's Teachers: A Report of the Holmes Group." November, 1986, 16.

Kershaw and McKean (1962), *Teacher Shortages and Salary Schedules.*

Kirby, S. N., D. W. Grissmer, and L. Hudson (1991). *New and Returning Teachers in Indiana: Sources of Supply*, RAND, R-4049-LE.

Kirby, S.N., L.D. Hammond and L. Hudson (1989), "Non traditional Recruits to Mathematics and Science Teaching," *Educational Evaluation and Policy Analysis*, Vol. 2, No. 3, pp. 301-323.

Ladd, Helen F. (1996), (editor) *Holding Schools Accountable*. (Washington, D.C.: The Brookings Institution).

Loadman, William E., and Craig W. Deville (1990). "The NTE as a Measure of General Academic Ability; Implications for Teacher Education," presented at Mid-Western Education Research Association, (Chicago, IL, October, 1990).

Manski, C. F. (1987), "Academic Ability, Earnings, and the Decision to Become a Teacher: Evidence from the National Longitudinal Study of the High School Class of 1972,". in David A. Wise (ed.), *Public Sector Payrolls* (Chicago: University of Chicago Press, 1987), 291-312.

Massachusetts Institute for Social and Economic Research (1987), *Report on the Status of Teacher Supply and Demand in Massachusetts.* (Amherst: University of Massachusetts, Massachusetts Institute for Social and Economic Research).

Monk, David H. and Jennifer A. King (1995), "Multilevel Teacher Resource Effects on Pupil Performance in Secondary Mathematics and Science: The Case of Teacher Subject-Matter Preparation," in Ronald Ehrenberg (editor) *Choices and Consequences: Contemporary Policy Issues in Education*, (Cornell University: ILR Press).

Murnane, R. J., Singer, J. D., and Willett, J. B. (1988), "The Career Paths of Teachers: Implications for Teacher Supply and Methodological Lessons for Research," *Educational Researcher, 17*, 22-30.

Murnane, R. J., Singer, J. D., and Willett, J. B. (1989). "The Influences of Salaries and 'Opportunity Costs' on Teachers' Career Choices: Evidence from North Carolina," *Harvard Educational Review, Vol. 59, No. 3*, pp. 325-346.

Murnane and Olsen, (1990), "The Effects of Salaries and Opportunity Costs on Length of Stay in Teaching: Evidence from North Carolina," *Journal of Human Resources*, 25:1, Winter 1990.

National Association of Schools of Business Administration (1994), *Statistical Information Service*, May 1994 results.

National Association of State Boards of Accountancy (1995). *CPA Candidate Performance on the Uniform CPA Examination.* (New York, New York), pp. 99, 103.

National Association of State Directors of Teacher Education and Certification (1996), *Manual on Certification and Preparation of Educational Personnel in the US and Canada.* (Dubuque, Iowa: Kendall-Hunt Publishing Co.).

National Center for Educational Statistics (1991), *Digest of Education Statistics 1991.*

National Center for Educational Statistics (1991), *Projections of Education Statistics to 2001: An Update.*

National Commission on Teaching and America's Future (1994). *Baccalaureate and Beyond.*(New York, New York).

National Commission on Teaching and America's Future (1996). *What Matters Most: Teaching for America's Future.*(New York, New York).

Olson, R.S. and Wolpin, K. (1983), "Fertility, Child Schooling and Exogenous Mortality: A Waiting Time Regression with Dynamic Regressors. *Econometrica*, Vol. 51, No. 3, pp. 731-49.

Pavalko, R. M. (1970), "Recruitment to Teaching: Patterns of Selection and Retention," *Sociology of Education, 43*, 340-355.

Pennsylvania Department of Education, Bureau of Teacher Preparation and Certification (1982), *Pennsylvania Department of Education Approved Certificated Assignments*, (Harrisburg, Pa.: June, 1982).

Pennsylvania Department of Education, Bureau of Teacher Preparation and Certification, Division of Teacher Education (1985), *Pennsylvania Department of Education Standards, Policies and Procedures for State Approval of Certification Programs and for the Certification of Professional Educators for the Public Schools of Pennsylvania.*

item Pennsylvania Department of Education (1992). *Teacher Supply and Demand, 1989/90.* Harrisburg, Pa.

Pennsylvania Educational Policy Studies (1994), *PEPS PC 5.0.* University of Pittsburgh, Learning Research and Development Center.

Schlechty, P. C., and Vance, V. S. (1983), "Recruitment, Selection, and Retention: The Shape of the Teaching Force," *Elementary School Journal, 83*, 469-487.

Sharp, L.M. and S.B. Hirshfield (1975), "Who Are the New Teachers: A Look at the 1971 College Graduates." (Washington, D.C.: Bureau of Social Science Research.

Smith, Roger A (1992). "Criteria for Hiring First Time Teachers, with an Emphasis on Technology Education," a report for the Technical Foundation of America, (December 13, 1992).

Stapleton, D.C. (1989), "Cohort Size and the Academic Labor Market," *Journal of Human Resources*, 24, 2, 221-253.

Strauss, Robert P. and Elizabeth Sawyer(1986), "Some New Evidence on Teacher and Student Competencies," *Economics of Education Review* 5, 1, 41-48.

Strauss, Robert P. (1989). *The Mon-Valley Education Consortium: Improving Access to Science and Math*, (Pittsburgh, Pennsylvania: Center for Public Financial Management, School of Urban and Public Affairs, May 1989)

Strauss, Robert P. (1990). *Establishing High School Advanced Science and Math Centers: A Feasibility Study for Allegheny Intermediate Unit 3*, (Pittsburgh, Pennsylvania: Center for Public Financial Management, School of Urban and Public Affairs, June 1990)

Strauss, Robert P. (1993). *Who Should Teach in Pennsylvania's Public Schools?* (Center for Public Financial Management, Carnegie-Mellon University).

Strauss, Robert P. (1994). "Teacher Certification Tests and the Personnel Decision," *Educational Management Guidelines*, 3, 7 (April, 1994), Pennsylvania School Boards Association, 1-3.

Strauss, Robert P. (1996). *Public Education in Western Pennsylvania: Students, Teachers and Curricula through 2005: A Background Paper for the Vira I. Heinz Endowment.*

Tryneski, John, Editor (1997). "Requirements for Certification of Teachers, Counselors, Librarians, Administrators for Elmentary and Secondary Schools: 1996-1997." (65th edition). (Chicago: The University of Chicago Press).

U.S. Bureau of the Census (1990). *Statistical Abstract of the United States: 1991* (111th edition). (Washington, D.C.)

Vance, V.S., and P.C. Schlechty. (1982), *Who Enters and Who Leaves Teaching? The Case of the High School Graduating Class of 1972.* (Washington,DC: NIE, U.S. Dept. of Education.

Weaver, W. T. (1983). *America's Teacher Quality Problem: Alternatives for Reform.* (New York: Praeger Publishing Co.).

Webster, W.J. (1988). "Selecting Effective Teachers,"*Journal of Educational Reasearch*

Zabalza, A. (1979), "The Determinants of Teacher Supply," *The Review of Economic Studies, 46(142)*, 131-147.

Zarkin, G. (1985), "Occupational Choice: An Application to the Market for Public School Teachers," *Quarterly Journal of Economics, Vol. 100, No. 2*, pp. 409-446.