DOCUMENT RESUME

ED 434 107 SP 038 795

AUTHOR Boe, Erling E.; Cook, Lynne H.; Paulsen, Christine Andrews; Barkanic, Gema; Leow, Christine S.

TITLE Productivity of Teacher Preparation Programs: Surplus or Shortage in Quantity and Quality of Degree Graduates. Data Analysis Report No. 1999-DAR2.

SPONS AGENCY Pennsylvania Univ., Philadelphia. Center for Research and Evaluation in Social Policy.; National Inst. on Educational Governance, Finance, Policymaking, and Management (ED/OERI), Washington, DC.

PUB DATE 1999-09-21

NOTE 96p.

CONTRACT R308F70031

PUB TYPE Numerical/Quantitative Data (110) -- Reports - Research (143)

EDRS PRICE MF01/PC04 Plus Postage.

DESCRIPTORS *College Graduates; Degrees (Academic); Elementary Secondary Education; Higher Education; Preservice Teacher Education; *Teacher Certification; *Teacher Education Programs; *Teacher Supply and Demand; Teachers; Teaching Skills

IDENTIFIERS Out of Field Teacher Assignment

ABSTRACT

This report contains national information about the productivity of teacher preparation programs in terms of quantity and quality (i.e., certification level) of its degree graduates who became employed as teachers in public and private schools. Data come from three large national probability samples of teachers taken over 7 years. The main sources were the Integrated Postsecondary Education Data System and the Public and Private School Teacher Questionnaires of the Schools and Staffing Surveys. This report presents the resulting data about the yield of degree graduates in a series of 22 tables. The focus is on one source of supply of teachers: degree graduates from teacher preparation programs. The report presents the summary results in terms of: trends in the yield of degree graduates, yield of entering teachers produced by degree graduates, yield of degree graduates as a function of certification status, yield of degree graduates as a function of out-of-field teaching, and trends in the surplus or shortage of degree graduates. Overall, the production of graduates from teacher preparation programs has been sufficient to meet demand, but there are some continuing shortages in certain areas. The appendixes present data sources and analysis methods, yield estimates from the Baccalaureate and Beyond Longitudinal Study, and a glossary. (Contains 23 references.) (SM)

PRODUCTIVITY OF TEACHER PREPARATION PROGRAMS: SURPLUS OR SHORTAGE IN QUANTITY AND QUALITY OF DEGREE GRADUATES[1]

Data Analysis Report No. 1999-DAR2

Erling E. Boe, Ph.D., Professor of Education
Graduate School of Education, University of Pennsylvania

Lynne H. Cook, Ph.D., Professor of Special Education
School of Education, California State University, Northridge

Christine Andrews Paulsen, Ph.D., Research Scientist
American Institutes for Research, Washington, D.C.

Gema Barkanic, B.A., Research Specialist
Graduate School of Education, University of Pennsylvania

and

Christine S. Leow, M.S.Ed., Research Assistant
Graduate School of Education, University of Pennsylvania

Center for Research and Evaluation in Social Policy
Graduate School of Education
University of Pennsylvania
3700 Walnut Street
Philadelphia, PA 19104

September 21, 1999

[1]Support for this research was provided by a grant (Award Number R308F70031) from the Field Initiated Studies Education Research Grant Program (CFDA Number: 84.308F), the National Institute on Educational Governance, Finance, Policy-Making, and Management, the Office of Educational Research and Improvement, the U.S. Department of Education, to Erling E. Boe at the University of Pennsylvania; and by the Center for Research and Evaluation in Social Policy, the Graduate School of Education of the University of Pennsylvania.

DATA ANALYSIS REPORTS

Data Analysis Reports are a means for rapid dissemination of the results of data analyses in tabular and graphical form with minimal description and discussion. These results may later be used as the basis for fully-developed research reports, policy briefs, journal articles, and/or other modes of dissemination.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION[1]

Overview

This report contains national information about the productivity of teacher preparation programs in terms of the quantity and quality (i.e., certification level) of its degree graduates who become employed as teachers in public and private schools. The percentage of such degree graduates who become employed as teachers is referred to as "yield." Other than a preliminary report based on a pilot study by Boe, Bobbitt, Cook, and Weber (1998), no national data have been reported to date on the "yield of degree graduates in education who majored in a teaching field offered by teacher preparation programs" for the national employed teaching force.[2] Subsequently in this report, the yield concept will often be abbreviated to "yield of degree graduates" and sometimes simply to "yield."

Though no other national data have yet been reported on yield, six state studies have found that the first-year yield of bachelor's degree graduates with majors in education for employment as teachers in public schools in their home states ranged from 35% to 50% percent, with a median of 43%.[3] In contrast with state data, this report provides information about (a) the national yield of degree graduates regardless of the state in which teacher preparation was completed, (b) national yield of degree graduates at both the bachelor's and master's degree levels within five broad fields of teacher preparation for both public and private schools, (c) the certification status of degree graduates who become employed teachers, (d) out-of-field teachers in terms of the match between a teacher's field of teacher

---

[1]See Appendix B (Glossary) for definitions used in this report.

[2]Though no other national data have been reported specifically on the yield of degree graduates from teacher preparation programs, data from the Baccalaureate and Beyond Longitudinal Study (B&B) of the U.S. National Center for Education Statistics have been reported by Henke et al. (1997, Table 8.1) from which yield percentages can be computed for individuals at the bachelor's degree level who were defined as having been prepared to teach. However, the definition used for "prepared to teach" by Henke et al. was based on completion of a student teaching course or whether a graduate had qualified for teacher certification within one year following graduation. By contrast, the definition of "prepared to teach" used in the research reported here is the completion of an education bachelor's degree with a major in a teaching field offered by teacher preparation programs. As described in detail in Appendix B, the definitions and methods used in this research reported here are so different as not to be comparable with those used with the B&B data by Henke et al.

[3]These yield data are found in five reports by the Southern Regional Education Board and Data and Decision Analysis, Inc. for Georgia (1996), Kentucky (1996), Oklahoma (1995), South Carolina (1995), Tennessee (1996), and Texas (1996).

preparation and subsequent teaching assignment, and (e) the surplus or shortage of degree graduates from five broad fields of teacher preparation.

The data used in this research were derived from three large national probability samples of teachers taken over a seven-year period for school years 1987-88, 1990-91, and 1993-94. Thus, the trend data reported are based on the number of nationally estimated teachers in public and private schools. The main sources of data were the Integrated Postsecondary Education Data System (IPEDS) and the Public and Private School Teacher Questionnaires of the Schools and Staffing Surveys (SASSs). All these data were collected by, and are available from, the National Center for Education Statistics (NCES), U.S. Department of Education. Data sources, the teacher sample, and data analysis procedures are described in Appendix A (Data Analysis Methods).

In brief, IPEDS provides national level data about all degree graduates from teacher preparation programs each year as stratified by field of study, degree level (bachelor's vs. master's), sex, and race. These data quantify the teacher supply source represented by such degree graduates, most of whom eventually become employed as teachers, while many do not. By contrast, SASS data were collected from the national employed teaching force in both public and private schools. With SASS, it is possible to quantify the number of teachers employed in a particular survey year and to determine (a) how many of them became employed teachers after recently completing a teacher preparation degree, (b) how many of them became employed teachers after having earned a teacher preparation degree over one year earlier, and (c) how many of them had recently earned a teacher preparation degree while serving as employed teachers.

By using data from both IPEDS and SASS, a wealth of information about the yield of degree graduates was quantified as reported here in a series of 22 tables:

1. The data reported in Tables 1 through 7 reveal major trends (i.e., changes over time) in total yield (and three components thereof) of degree graduates. The three components of yield are represented by the percentage of total degree graduates in one year who:

   - entered the ranks of employed teachers within one year after graduation,
   - delayed their entry to the ranks of employed teachers by more than a year following graduation, and
   - were already employed as teachers at the time of graduation.

   Trends over time in these three components of yield, and their total, are reported as a function of five broad fields of teacher preparation, degree level (bachelor's and master's degree graduates), sex of degree graduates, and race of degree graduates.

2. The data reported in Tables 8 through 11 focus more specifically on the yield of degree graduates who enter the ranks of employed teachers during a particular year (both recent graduates and delayed entrants) in comparison with continuing teachers, all as a function of sector (public vs. private schools), teaching assignment level (elementary vs. secondary), community type (rural, suburban, and urban), and school size (small, medium, and large).

3. The data reported in Tables 12 through 16 provide information about the certification status (fully certified vs. partly certified) in the main teaching assignment given to degree graduates who become employed as teachers, all as a function of the three components of yield (as defined above), out-of-field teaching in terms of the match (or mismatch) between a degree graduate's field of teacher preparation and teaching assignment, sector, teaching assignment field of employment, degree level, sex, and race.

4. The data reported in Tables 17 through 19 provide information about the degree of out-of-field teaching in terms of the mismatch between a degree graduate's broad field of teacher preparation and teaching assignment field of employment, all as a function of sector, teaching assignment field, degree level, sex, and race.

5. The data reported in Tables 20 through 22 provide information about trends over time in the surplus or shortage of degree graduates as a function of sector and broad field of teacher preparation.

The focus of this report is on one source of supply of teachers, viz., degree graduates from teacher preparation programs. There are, of course, other sources of supply of teachers as well. A related "Data Analysis Report" issued by the Center for Research and Evaluation in Social Policy, Graduate School of Education, University of Pennsylvania (Boe, E. E., Bobbitt, S. A., Cook, L. H., Barkanic, G., & Maislin, G., 1998), provides trend and predictive data on all sources of supply of teachers for public schools, including degree graduates from teacher preparation programs, as well as degree graduates with other majors and reentering experienced teachers.

Degree versus Non-Degree Graduates from Teacher Preparation Programs

As stated in the title and elsewhere in this report, this research is based specifically on degree graduates (as distinguished from non-degree graduates) from teacher preparation programs. For example, some graduates may earn a bachelor's or master's degree with a major in English education as a field of study within education that is recognized by IPEDS. Students such as this are defined as degree graduates from teacher preparation programs. However, other students may earn a bachelor's or master's degree with a major in English while simultaneously enrolled in a teacher preparation program leading to certification as a teacher of English. Students such as this are regarded as non-degree graduates from teacher preparation programs. Unfortunately, individuals completing the latter type of teacher

preparation are excluded from this research because no national data are available from IPEDS (or any other national source) about them.[4]

Since this research is based specifically on degree graduates (but not all graduates) of teacher preparation programs, a question arises as to how representative the yield data reported here are of non-degree graduates, and, more generally, all graduates. In our judgment, the answer is "sufficiently representative to be informative and useful."

In support of this judgment, we note that data from several sources indicate that degree graduates from teacher preparation programs represent a substantial majority of all graduates at the bachelor's degree level. Using national data from NCES's Baccalaureate and Beyond Longitudinal Study (B&B) (Henke, Geis, Giambattista, & Knepper, 1996) it is possible to define a teacher preparation graduate as one who completed at least one course in student teaching prior to graduating with a baccalaureate degree. By this criterion according to 1992-93 B&B data, 62% of teacher preparation graduates had earned an education degree, while 38% had earned degrees in all other fields combined.[5] In addition, data on the degree graduates and non-degree graduates from teacher preparation programs is available from two states. In Kentucky, degree graduates with education majors represented 78% of all graduates who completed teacher preparation in 1991 (SREB, 1995a) and 79% in 1995 (SREB, 1996b). Similarly in South Carolina, degree graduates with education majors represented 78% of all graduates who completed teacher preparation in 1993 (SREB, 1995c).

The national and state data reviewed above all indicate that a substantial majority of graduates from teacher preparation programs have earned degrees in education instead of in arts and sciences disciplines or in other fields. Furthermore, we know of no evidence, or compelling reason to assume, that the yield of degree graduates with majors in teacher preparation would be substantially more, or less, than for graduates with degrees in other fields. At the very least, the yield information reported here is nationally representative of a substantial majority of graduates who have completed teacher preparation. In addition, the yield information reported is probably representative of the minority of graduates with degrees in fields other than education who have also completed teacher preparation.

---

[4]As will be discussed, there is a national data base for bachelor's degree graduates from which some estimates can be made about non-degree graduates of teacher preparation programs.

[5]Data obtained from a computer run by NCES's National Data Resource Center, January 4, 1999.

SUMMARY RESULTS

The data analysis methods used for this research are described in Appendix A, while definitions of terms are given in the Glossary of Appendix B. All group differences and trends over time discussed and interpreted in the results described below are statistically significant at the .05 level or less. The probability level of many comparisons and trends are reported in the tables of results presented in this report.

Trends in The Yield of Degree Graduates

This section contains information about trends over years (1987, 1990, and 1993) in the yield of degree graduates from teacher preparation programs as a function of attributes of the graduates such as the broad teaching field of preparation and their degree level, sex, and race. As seen in Table 1, the following three components of yield have been computed:

1. The yield percentage for degree graduates from teacher preparation programs in one school year who entered teaching employment during the following school year (i.e, recent graduates who entered teaching employment),

2. The yield percentage for degree graduates from teacher preparation programs in one school year who simultaneously were employed as teachers and who continued as employed teachers during the following school year (i.e., recent graduates who continued teaching employment), and

3. The yield percentage for degree graduates from teacher preparation programs who had delayed their first entry into the employed teaching force by more than one year following graduation (delayed entrants to teaching employment).

The computation of yield as a percentage of total degree graduates was accomplished by the following steps:

- First the number of degree graduates from a teacher preparation program in one year (e.g., 1993) is obtained from IPEDS. This represents the supply of such degree graduates.

- Next, for a given school year (e.g., 1993-94), the number of (a) entering teachers who earned a degree from a teacher preparation program within the past year, (b) continuing teachers who did likewise, and (c) entering teachers who earned such a degree in prior years, was obtained from SASS.

- Finally, the number of teachers of each of three types (as obtained from SASS) was computed as a percentage of the total number of degree graduates (as obtained from IPEDS). This percentage is the yield percentage for each component--the sum of which is the total yield percentage.

1. Trends in the Supply of Degree Graduates: The gross national supply of degree graduates from teacher preparation programs in the United States is shown in Figure 1 for general education and special education as a function of degree level (bachelor's and master's). Following a decline in the production of degree graduates from 1977 through the mid-1980s, production began to rise again and leveled off at a little over 150,000 per year during the first half of the 1990s (numbers for special and general education, and bachelor's and master's degrees, combined). The research reported here focuses on the yield of these graduates for the national employed teaching force for the years 1987 (124,032 graduates), 1990 (146,624 graduates), and 1993 (153,917 graduates). These numbers of total graduates by year are carried over to the first row of Table 1.
2. Main Trends in Yield Components by Year: The total yield of degree graduates from teacher preparation programs in 1987, 1990, and 1993, for public and private schools combined, is shown in the lowest section of Table 1. To compute the yield percentage by year, the nationally estimated number of degree graduates who became, or were, employed as teachers is converted to a percentage of the total degree graduates in the same year (carried over from Figure 1 to the top row of Table 1). The total yield results were virtually the same for the two most recent time periods (71% in 1990 and 72% in 1993), while it was slightly (but not significantly) higher in 1987 (75%). Furthermore (as discussed below), Table 1 shows three components of yield, also computed as a percentage of total degree graduates during each of the three one-year time periods studied.
   a. Yield of recent graduates who entered teaching: Contrary to what might be expected, only a moderate percentage of recent degree graduates from teacher preparation programs actually entered employment as teachers within a year of graduation (28% of about 147,000 degree graduates in 1990; 25% of about 154,000 degree graduates in 1993). Quite clearly, being hired as a teacher soon after completing degree study in a teacher preparation program was not the conventional route for entering the national employed teaching force during the years studied. (See Table 1.)

   b. Yield of recent graduates who were already employed as teachers: Also contrary to what might be expected, a considerable percentage of recent degree graduates from teacher preparation programs were already employed as teachers at the time of graduation (21% of about 147,000 degree graduates in 1990; 21% of about 154,000 degree graduates in 1993). From the perspective of the annual production of degree

graduates by teacher preparation programs, it is clear that upgrading the degree credentials of practicing teachers, as well as producing a cohort of entering teachers, are both important immediate contributions to staffing our nation's schools. (See Table 1.)

c. Yield of delayed entrants to teaching: In addition to the annual yield of degree graduates from teacher preparation programs, there is also the longer-term yield of first-time teachers who delay their entry to teaching employment by at least one year following graduation (22% of about 147,000 degree graduates in 1990; 27% of about 154,000 degree graduates in 1993). Delayed yield has obviously been a major component of the productivity of teacher preparation programs for the employed teaching force--a component that often pays off many years after degree completion. (See Table 1.)

3. Trends in Yield Components by Year and Teacher Preparation Field: The three yield components, and their total, of degree graduates from all fields of teacher preparation for public and private schools (as shown in Table 1) were disaggregated into five broad fields of teacher preparation (general elementary, general secondary, physical and health education, vocational and business education, and special education). The results can be seen in Tables 2, 3, and 4 separately for the three years studied (1987, 1990, and 1993). Inspection of the total yield percentages (and their associated confidence limits) reveals the following differences:

   a. Trends over Years for Each Teacher Preparation Field: From 1987 to 1993, decreasing total yield percentages was observed for elementary education (dropped from 85% to 69%) while increasing yield percentages were observed for Physical Education/Health (rose from 30% to 48%) and vocational and business education (rose from 36% to 71%). However, no differences between the total yield percentages for 1990 and 1993 were observed for any of the five teaching preparation fields. (See Tables 2, 3, and 4.)

   b. Differences among the Five Teacher Preparation Fields in Total Yield Percentages for 1993: As seen in Table 4, total yield in 1993 ranged from a low of 48% (for physical and health education) to a high of 93% (for general secondary education). However, a transcript study of the teachers' responses to the 1990 Public School Teachers Questionnaire (Chaney, 1994) demonstrated that secondary teachers over reported the number of degrees earned with majors in education and correspondingly under reported majors earned in the associated discipline (e.g., to report a major in mathemat-

ics education instead of mathematics, or in English education instead of English). According to the study of this phenomenon, the number of degrees reported as earned in secondary education may have been inflated by about 8%. If so, an adjusted total yield of 85% for general secondary education (e.g., the total yield of 93% as reported in Table 4 minus the estimated 8% due to over reporting equals 85%). In view of this uncertainty about the yield percentages for secondary education, little more will be discussed about this particular teacher preparation field. Other than this, the total yield for physical education/health (48%) is lower than that in all other fields, but only lower at a statistically significant level in comparison with elementary education. In general, the results do not demonstrate a dramatic difference in total yield percentages as a function of teacher preparation field.

c. Differences among the Five Teacher Preparation Fields in Three Yield Component Percentages: For all three years studied, the yield percentage for entering teachers and for continuing teachers was consistently low for physical/health education and vocational/business education in comparison with the other teacher preparation fields. For special education (which experiences large chronic shortages of fully certified teachers according to Boe, Cook, Bobbitt, & Terhanian, 1998), however, the yield percentage for continuing teachers was consistently high during each of the three years studied, and for delayed entrants was consistently low, in comparison with the other teaching fields. By contrast, very few continuing teachers earn degrees in physical/health education--fields in which it is generally recognized that there are surpluses instead of shortages of teachers. (See Tables 2, 3, and 4.)

4. Trends in Yield Components by Year and Degree level: The yield of degree graduates (as shown in Table 1) was analyzed separately for two degree levels (bachelor's and master's). The results are shown in Table 5 for the three years studied (1987, 1990, and 1993). The yield percentages were very similar from year to year. However, the results demonstrate that yield percentages depended to a great extent on degree level with considerably higher total yield for master's graduates (e.g., 82% in 1993) than for bachelor's graduates (e.g., 68% in 1993). Even more striking is the fact that very few bachelor's degrees in a teacher preparation field were earned by continuing teachers (only 2% in 1993), while a substantial majority of master's degrees in a teacher preparation field were earned by continuing teachers (63% in 1993). In fact, the high yield observed for master's graduates is attributable solely to the continuing teachers who earn degrees. In contrast with most master's graduates, most bachelor's graduates became entering

teachers (31% were recent graduates in 1993, while 36% were delayed entrants), while few master's graduates became entering teachers (only 12% were recent graduates in 1993, and a modest 7% were delayed entrants). Overall, the results shown in Table 5 indicate that the total yield, and the components of yield, of degree graduates from teacher preparation programs depended to a great extent on the degree level of teacher preparation. The general similarity of these results from over the three years studied demonstrates a consistency over time and replicability with large independent national samples of teachers.

5. Trends in Yield Components by Year and Sex of Degree Graduates: The yield of degree graduates (as shown in Table 1) was analyzed separately for male and female graduates. The results, as shown in Table 6 for the three years studied (1987, 1990, and 1993), indicate that the yield of degree graduates depended on the sex of graduates. First, the total yield percentage for male graduates grew steadily from 1987-88 through 1993-94, while the total yield for females declined somewhat during the seven-year period studied. Most striking are (a) the growth in the yield percentages of delayed entrants, especially for male graduates which accounted for most of the growth in total yield for male graduates, and (b) the decline in the yield percentages of female graduates who were continuing teachers, which accounted for the decline in total yield for female graduates. By 1993, the total yield of male graduates became comparable to that for female graduates.
6. Trends in Yield Components by Year and Race of Degree Graduates: The yield of degree graduates (as shown in Table 1) was analyzed separately for White and Non-White graduates. The results, as shown in Table 7 for the three years studied (1987, 1990, and 1993), indicate that the yield of degree graduates depended on the race of graduates. First, the total yield percentage for Non-White graduates grew steadily from 1987-88 through 1993-94, while the total yield for White graduates declined somewhat during the seven year period studied. Most striking are (a) the growth in the yield percentages of entering teachers (both of recent graduates and delayed entrants) for Non-White graduates, which accounted for the steady growth in their total yield, and (b) the decline in the yield percentages of White graduates who were continuing teachers which accounted for the decline in total yield for White graduates. By 1993, the total yield of Non-White graduates became comparable to that of White graduates.

7. Summary of Trends in the Yield of Degree Graduates: Some of the main findings are:

- Over 25% of degree graduates from teacher preparation programs do not become employed as teachers in either public or private schools--a striking number when considered in light of the current and projected shortage of highly qualified entering teachers (National Commission on Teaching and America's Future, 1996).

- Close to two-thirds of master's degree graduates from teacher preparation programs were already employed as teachers. While they were therefore not available to fill open teaching positions, they became more qualified as teachers through completing teacher education and thereby upgraded the quality of the teaching force.

- There was a trend toward increased yield of first-time teachers who delayed their entry to the employed teaching force, an alarming finding because national evidence indicates that delayed entrants are much less likely to be fully certified in their main teaching assignment (Boe, Bobbitt, et al., 1998). It is likely that delayed entrants will have forgotten much of what they learned about their subject matter and teaching practice, and that much of what they do remember will become obsolete due subsequent advances in knowledge and practice.

- The particularly low yield percentage for physical education/health suggests overproduction of graduates in this broad teaching field.

- Since teaching has traditionally been predominantly a female profession, the increased yield of male degree graduates (even though much of the gain occurred in the delayed entrants component) was particularly fortunate because male teachers accounted for only 12% of all teachers at the elementary level and 44% at the secondary level in public and private schools in 1993-94 (data from a subsidiary analysis for this report).

- The trend toward increased yield of minority degree graduates is also promising because the teaching profession has made the recruitment of such graduates a priority (Kennedy, 1992). This was particularly fortunate because Non-White teachers accounted for only 13% of public school teachers in 1990-91 (Choy, Henke, Alt, Medrich, & Bobbitt, 1993), a percentage that was much below the percentage of Non-White students.

Yield of Entering Teachers Produced by Degree Graduates

The previous section contains information about the total yield of degree graduates from teacher preparation programs, whereas the focus of this section is on the yield of entering teachers (i.e., excluding the continuing teacher component of yield). In addition, the previous section provided information on the attributes of degree graduates who became teachers, such as the broad teaching field in which they concentrated and their degree level, sex, and race. In this section, the yield of degree graduates is considered as a function of differences in the schools in which they became employed such as sector (public vs. private schools),

level (elementary vs. secondary), school size (small, medium, large), and community type (rural, suburban, urban).

As seen in Table 1, a distinction is made between entering teachers (those who assume employment as a teacher in any one year) and continuing teachers (those who continue employment as a teacher from one year to the next). Among entering teachers, a distinction is made between those who were recent graduates upon entering teaching employment, and delay entrants who waited more than a year following graduation before becoming employed as teachers. As described in more detail in Appendix A (Data Analysis Methods), the analyses reported in the tables for this section (Tables 8 through 11) pertain to the following indicators of the productivity of teacher preparation programs:

- The yield of entering teachers from among degree graduates from teacher preparation programs net of degree graduates who were already employed as teachers at the time of graduation. Net degree graduates represent the supply of degree graduates who were potential entering teachers.

- The percentage of continuing teachers who recently earned a degree from a teacher preparation program. This percentage is a quantitative index of one major contribution of teacher preparation programs to upgrading the qualifications of the continuing employed teaching force (as distinguished from entering teachers).

In order to compute yield percentages for entering teachers as a function of school variables such as sector and level, it was necessary to allocate the number of net degree graduates to the different levels of a school variable. This allocation was performed in accordance with the percentage of entering teacher positions at each level of a school variable (see Appendix A for a description of the allocation method). This method of computing yield of net degree graduates as a function of school variables provides yield information in relation to (and controlled for) the number of openings for entering teachers.

The analyses reported in this section were all based on yield data from independent national probability samples for three years combined (1987, 1990, 1993). Preliminary analyses demonstrated that aggregating data was justified because the trends over this seven-year time period were negligible, and the aggregated data entailed sample sizes sufficient to make possible the level of detailed tabulations reported below.

8. Yield of Entering Teachers by Sector: As seen in Table 8, the yield of entering teachers for public schools (70%) was much higher than for private schools (46%). The higher yield percentage for public schools was particularly noticeable for recent graduates. All this is evidence for the prevalent perception that public schools, in general, recruit

graduates from teacher preparation programs more aggressively than do private schools.[6] Further evidence of this is seen in Figure 2 in which are depicted all sources of entering teacher supply for public and private schools for school years 1990-91 and 1993-94 combined. Of all entering teacher hires, degree graduates from teacher preparation programs (recent graduates and delayed entrants combined) accounted for 41.5% in public schools, whereas they only accounted for 27.4% in private schools. In addition, percentage of degree graduates entering private schools who were only partly certified in their main teaching assignment was much higher in private schools (about 40%) than it was in public schools (about 22%). With respect to the continuing teacher data of Table 8, it was somewhat surprising to find very similar percentages of public and private continuing teachers (1.3% and 1.1%, respectively) who completed degrees from a teacher preparation program during a one year period.

9. Yield of Entering Teachers by Sector and Teaching Assignment Level: For both public and private schools, the yield of entering teachers from among degree graduates was much higher at the elementary level than the secondary level (see Table 9). In particular, the yield of degree graduates at the secondary level for private schools was especially low. All this is not surprising because specialized teaching by subject matter (e.g., mathematics, English, etc.) is common at the secondary level. This makes discipline majors from Arts and Sciences majors more competitive with degree majors in education for specialized teaching positions at the secondary level, and may lead to the lower yields seen in Table 9 for degree majors from teacher preparation programs . As to continuing teachers, however, the percentages who completed teacher preparation degrees in one year did not differ appreciably between the elementary and secondary levels.
10. Yield of Entering Teachers by Sector and School Size: As seen in the top row of Table 10, the allocated "fair share" of degree graduates from teacher preparation programs increases with the size of public schools, but decreases with the size of private schools. This reflects differences in the school size distributions by sector, with large schools tending to be found in the public sector and proportionately more small schools in the private sector. The yield of entering teachers from among degree graduates was higher in small public schools (72%) than in large public schools (58%). More generally, neither

[6]As observed by Henke et al. (1997), new teachers without undergoing formal teacher preparation often work in private schools.

yield percentages nor the percentage of continuing teachers who recently earned teacher prep degrees were strongly associated with school size.

11. Yield of Entering Teachers by Sector and Community Type: For public schools, the yield of entering teachers from among degree graduates was highest for schools located in rural areas (77%) as contrasted with suburban (60%) and urban (65%) areas (see Table 11). A similar trend (but not statistically significant) can be seen for private schools. The reasons for higher yield of degree graduates for rural public schools are not clear. It might be that suburban schools, with better pay and working conditions than rural and urban schools, are more competitive for recruiting experienced (and therefore proven) teachers, while rural and urban areas must take the lesser-qualified recent or delayed first-time teachers.
12. Summary of Yield of Entering Teachers: In this section, the focus is the yield of entering teachers from among degree graduates from teacher preparation programs as a function of differences among schools that employ such graduates. The yield of such degree graduates for entering teacher positions was particularly high for public schools (vs. private schools), at the elementary level (vs. secondary level), and for rural areas (vs. suburban and urban areas). Given that about one in four degree graduates never become employed as teachers, these findings suggest aspects of the educational system (e.g., private schools, the secondary level, and urban areas) where there might be room for improvement in the recruitment of degree graduates.

Yield of Degree Graduates as a Function of Certification Status

The focus of this section is on the certification status of degree graduates from teacher preparation programs who became employed as teachers. The certification status of teachers (either fully certified or partly certified in their main teaching assignment) is the most fundamental of qualifications because all states require by law or regulation that public schools hire teachers who are fully certified in their main teaching assignment. The certification status of degree graduates was analyzed as a function of the match between the broad field of teacher preparation and teaching assignment, sector, teaching field of assignment, degree level, teacher sex, and teacher race. Thus, this analysis was not of yield percentages per se, but of the certification status of degree graduates who compose the yield (i.e., who became employed as teachers).

The analyses reported in this section were all based on certification data from independent national probability samples for three years combined (1987, 1990, 1993).

Preliminary analyses demonstrated that aggregating data was justified because the trends over this seven-year time period were negligible, and the aggregated data entailed sample sizes sufficient to make possible the level of detailed tabulations reported below.

13. Yield as a Joint Function of Certification Status and Out-of-Field Teaching: Data on the nationally-estimated number of teachers by certification status and yield component are shown in Table 12, as further classified by the match or mismatch between a teachers broad field of teacher preparation and teaching assignment (i.e, general elementary, general secondary, physical/health education, vocational/business education, and special education). The data show that roughly 60,000 of 308,000 teachers over the three year period were only partly certified in their main teaching assignment, and another roughly 60,000 were teaching out-of-field (i.e., there was a mismatch between broad teaching field of preparation and assignment). The number of teachers within each cross-tabulation of Table 12 were subdivided into those that were fully certified and those that were partly certified in their main teaching assignment. The percentages of those who were only partly certified are shown in Table 13. Several xx^2 tests demonstrated that, for each yield component, the nationally estimated number of teachers were a joint function of certification status and teaching out-of-field status. For example, the lowest level of part certification (9.8%) was found in continuing teachers who had recently earned a degree and whose preparation and assignment fields matched. By contrast, the highest level of part certification (38.2%) was found in delayed entrants whose preparation and assignment fields mismatched. All delayed entrants and all mismatched teachers were the least qualified (28.1% and 28.0% partly certified, respectively). Most importantly and disappointingly, the overall results demonstrated that 20.3% of all degree graduates yielded in one year from teacher preparation programs were not fully certified in their main teaching assignments.
14. Yield of Partly Certified Graduates by Sector: As seen in Table 14, a much higher percentage of degree graduates from teacher preparation programs who became employed in private schools (38.6%) were only partly certified in their main teaching assignment in comparison with those in who became employed in public schools (17.2%). Substantial differences in teacher certification status between public and private schools were found for all three components of yield. This suggests either that private schools hired degree graduates who were much less qualified than those hired by public schools or did not place them in teaching assignments for which they were certified, or some combination of both. Even for public schools, about one in five

entering degree graduates (of both the recent graduates and delayed entrants types) was only partly certified in their main teaching assignment.

15. Yield of Partly Certified Graduates by Teaching Assignment Field: The certification status of recent degree graduates from teacher preparation programs (i.e., the annual yield) who became employed as teachers did not vary with the broad teaching field of their employment. However, the percentage of delayed entrants who were only partly certified in their main teaching assignment was a function of the broad teaching field of assignment with a particularly high percentage of partly certified delayed entrants in special education (41.2%) and much lower partly certified percentages in general elementary education (17.7%) and physical/health education (23.5%). It seems as though the teacher shortage in special education (Boe, Cook, et al., 1998) necessitates the hiring of a remarkably high percentage of delayed entrants who have not been prepared to teach in this field.
16. Yield of Partly Certified Graduates by Degree Level: Of degree graduates from teacher preparation programs who became employed as teachers, a much higher percentage of bachelor's graduates (24.9%) than master's graduates (12.7%%) was only partly certified in their main teaching assignment (see Table 16). This certification difference between degrees was entirely due to the yield component for continuing teachers. It is not surprising that, among continuing teachers, recent master's graduates demonstrate a higher level of certification than recent bachelor's graduates, since master's graduates have more education and probably more teaching experience than bachelor's graduates.
17. Yield of Partly Certified Graduates by Sex of Degree Graduates: As seen in Table 16, the certification status of degree graduates from teacher preparation programs who became employed as teachers was only a modest function of the teachers' sex (24.0% partly certified for male teachers, 19.4% for female teachers).
18. Yield of Partly Certified Graduates by Race of Degree Graduates: As also seen in Table 16, the certification status of degree graduates from teacher preparation programs who became employed as teachers was only a modest function of the teachers' race (19.6%% partly certified for White teachers, 25.3%% for Non-White teachers).
19. Summary of Yield as a Function of Certification Status: The main finding was that a remarkably high percentage (20.3%) of degree graduates from teacher preparation programs in any one year who became employed as teachers was only partly certified in their main teaching assignment. That is, one in five such graduates, upon employment, had not qualified for the most basic credential for practicing in the specific main teaching

assignment in which they had been placed. The percentage of degree graduates from teacher preparation programs who were only partly certified was even worse for delayed entrants (28.1%), individuals whose field of teacher preparation and teaching assignment were mismatched (28.0%), private school teachers (38.6%), bachelor's degree graduates (24.9%), male degree graduates (24.0%), and Non-White degree graduates (25.3%). No doubt more than a trivial portion of these partly certified percentages was due to misplacement of degree graduates in assignments for which they are underqualified as distinguished from the graduates not qualifying for full certification for any teaching assignment. Nonetheless, the result was the same for students who were taught by recent degree graduates--many of their teachers many not fully certified to teach them. Of course, as Boe, Bobbitt, et al. (1998) and others have shown, there is a certain percentage of experienced continuing teachers who are also partly certified in their main teaching assignment (about 6% nationally in public schools in 1993-94). Unfortunately, the partly certified percentage of entering teachers from teacher preparation programs was over three times higher.

Yield of Degree Graduates as a Function of Out-of-Field Teaching

The focus of this section is on out-of-field teaching in terms of the match between the broad teaching field of preparation and teaching assignment of degree graduates from teacher preparation programs who became employed as teachers. The correspondence between five broad teacher preparation and teaching assignment fields (i.e, general elementary, general secondary, physical/health education, vocational/business education, and special education) was classified as either a match or a mismatch. The mismatch status of recent degree graduates was analyzed as a function of sector, teaching field of assignment, degree level, teacher sex, and teacher race. Thus, the analysis was not of yield percentages per se, but of the out-of-field teaching status of degree graduates who composed the yield (i.e., who became employed as teachers).[7]

[7]Though the analysis of out-of-field teaching presented here is similar in some respects to that reported by Ingersoll and Gruber (1996), there are many differences. For example, Ingersoll and Gruber's analysis pertained to all employed secondary school teachers in public schools with main teaching assignments in specific academic disciplines (English, mathematics, history, etc.). By contrast, the data on out-of-field teaching reported here pertain to all degree graduates of teacher preparation programs in a particular year who become employed as teachers in both public and private schools in five broad teaching fields at either the elementary or secondary levels. Therefore, the specific results reported here are not comparable to those reported by Ingersoll and Gruber.

The analyses reported in this section were all based on match/mismatch data from independent national probability samples for three years combined (1987, 1990, 1993). Preliminary analyses demonstrated that aggregating data was justified because the trends over this seven-year time period were negligible, and the aggregated data entailed sample sizes sufficient to make possible the level of detailed tabulations reported below.

20. Yield of Mismatched Graduates by Sector: As seen in Table 17, the main finding is that a high percentage (19.8%) of degree graduates in any one year from teacher preparation programs who became employed as teachers were placed in teaching assignments that did not match their broad field of teacher preparation. This high mismatch percentage was found even though only five broad teaching fields were examined, as contrasted with much more specific teaching assignments (e.g., physics, German, music, etc.). If a much finer grain of classification had been possible, it is certain that a much higher degree of out-of-field teaching would have been found. As it is, the overall mismatch of 19.8% is virtually the same as the overall level of partly certified teachers (20.3%) shown in Table 13. Table 12 shows that only 201,905 (65%) of 308,435 degree graduates were both fully certified and placed in a teaching assignment matching their field of preparation. Finally, Table 17 shows that the mismatch percentage did not differ between public and private schools.
21. Yield of Mismatched Graduates by Teaching Assignment Field: Out-of-field teaching by degree graduates from teacher preparation programs varied as a function of the teaching assignment field of employment (see Table 18). Graduates assigned to general elementary and physical/health eduction had low mismatch percentages (9.3% and 11.2% respectively), while the mismatch percentages for general secondary, vocational/-business education, and special education were much higher (31.5%, 23.6%, and 27.6% respectively). Insofar as the three components of yield are concerned, there is sufficient sample size to observe that similar differences pertain to all three yield components for general elementary, general secondary, and special education. As with certification status by teaching field (see Table 15), the highest level of mismatched degree graduates were found among the delayed entrants to special education (51.8%)--a further indication of the severe shortage of teachers in this field (Boe, Cook, et al., 1998).
22. Yield of Mismatched Graduates by Degree Level: Out-of-Field Teaching by degree graduates from teacher preparation programs did not vary as a function of the degree level of graduates (see Table 19).

23. Yield of Mismatched Graduates by Sex of Degree Graduates: As seen in Table 19, out-of-field teaching by degree graduates from teacher preparation programs did not vary as a function of the sex of graduates.
24. Yield of Mismatched Graduates by Race of Degree Graduates: Table 19 also shows that out-of-field teaching by degree graduates from teacher preparation programs did not vary as a function of the race of graduates.
25. Summary of Yield as a Function of Mismatch Status: With respect to out-of-field teaching, the main finding was that a remarkably high percentage of degree graduates from teacher preparation programs (19.8%) was placed in a broad teaching assignment field that did not match their field of teacher preparation. That is, one in five such graduates, upon employment, was not assigned to teach even in the broad teaching field that matched their field of preparation. Therefore, on this indicator of teacher quality, both degree graduates and the students they instruct were poorly served by the educational system. Out-of-field teaching by degree graduates was even higher than the overall mismatch percentage (19.8%) in the teaching fields of general secondary, vocational/business education, and special education (mismatch percentages of 31.5%, 23.6%, and 27.6% respectively).

Trends in the Surplus or Shortage of Degree Graduates

The focus of this section is on trends over a seven year period (1987, 1990, 1993) in the relationship between the national supply of degree graduates from teacher preparation programs and the national demand for entering teachers. It is possible that the supply is in excess of demand (the definition of a surplus of degree graduates) or that the supply is lower than the demand (the definition of a shortage of degree graduates). Furthermore, it is possible that a surplus or shortage of degree graduates varies with the broad teaching field in which graduates have been prepared. Since this analysis focused on the demand for entering teachers, it did not address the need to upgrade or replace continuing teachers who were not fully certified in their main teaching assignment or were otherwise underqualified. However, to the extent that the employment of such teachers was discontinued at their home schools and did not find teaching employment at a different school, an increase in the demand for entering teachers to replace them ordinarily occurred (i.e., unless the teaching position was discontinued or filled by a teacher from a different position that had been discontinued).

The surplus or shortage of degree graduates from teacher preparation programs was computed separately for each of five broad teaching fields (i.e, general elementary, general

secondary, physical/health education, vocational/business education, and special education) by the following method:

- In order to quantify the supply of degree graduates who were potentially available to fill open positions for entering teachers, the number of employed continuing teachers who earned teacher preparation degrees were subtracted from the total number of degree graduates, the difference being referred to as net degree graduates.

- In order to quantify the demand for degree graduates to fill open positions for entering teachers for which recent degree graduates and delayed entrants might reasonably be expected to be competitive, the number of open teaching positions for entering teachers that were filled by reentering experienced teachers (who were fully certified in the teaching assignments into which they were hired) was subtracted from the total number of open positions for entering teachers, the difference being referred to as net open teaching positions.

The results of this analysis of the supply of, and demand for, recent degree graduates and delayed entrants from teacher preparation programs is shown by year for public schools, and for public and private schools combined, in Tables 20, 21, and 22. In Table 20, for instance, the net supply of degree graduates is recorded in the first column for five degree fields, while the net demand for entering degree graduates is recorded in the second column. The difference between the net supply and net demand defines a surplus or shortage of degree graduates for filling these open positions. In general elementary education, for example, the supply of degree graduates exceeded the public school demand by about 10,000 graduates (a surplus), while this supply of degree graduates fell short of the total public plus private school demand by about 4,700 graduates. As shown in the final column, theses surplus or shortage quantities were converted to a ratio between the supply (S) and demand (D) (i.e., the S/D ratio), thereby making it possible to compare degree fields in terms of a common indicator.

Consider first the overall surplus or shortage of degree graduates in relation to open positions in public schools. From Tables 20, 21, and 22, it can be seen that the S/D ratio was 1.13, 1.17, and 1.08 in 1987, 1990, 1993, respectively, even though the production of degree graduates increased from 89,000 to 112,000 during this seven year period. These ratios indicate a remarkable stability in the production of degree graduates in relation to demand. Similarly, there was considerable stability in the S/D ratios over the seven year period for all five degree fields. More specifically, general elementary education and vocational/business education were in a considerable surplus, physical/heath education were in great surplus (but a sharply declining surplus from 1987 to 1993), special education

experienced a considerable shortage, and general secondary education apparently experienced an enormous and increasing shortage (as considered further below).

Although these S/D ratios for public education represent the major considerations in understanding the surplus and shortage of the production of degree graduates by teacher preparation programs nationally, there are two other important considerations to take into account. The first is the demand for degree graduates by private schools (as considered further below); the second is the production of non-degree graduates by teacher preparation programs (i.e., degree majors in academic disciplines who complete preparation for teacher certification as provided by teacher preparation programs). As reviewed on page 3 and 4 above for total bachelor's degree graduates from teacher preparation programs, available evidence suggests that another 30% to 60% of non-degree graduates have been prepared annually for certification as teachers. If we roughly estimate the national percentage to be 45%, the number of net graduates prepared as teachers (excluding continuing teachers) in 1993 increases from about 121,000 (see Table 22) to about 167,000.[8] Given these estimates, there seems to have been a great surplus in the production of total graduates nationally (i.e., degree plus non-degree)--at least so far as public schools are concerned.

If such a surplus of graduates from teacher preparation programs (degree plus non-degree) was being produced annually, it may seem surprising that so many underqualified teachers have been employed routinely and that there is ongoing concern in the field of education over actual and projected teacher shortages. It therefore seems that a very substantial number of graduates of teacher preparation programs do not seek employment as teachers, or, if they do seek to become so employed, do not find teaching positions that they are willing to accept. After all, the yield data for degree graduates for 1993 (see Table 1) indicate that of 121,000 degree graduates (who were not already employed as teachers), only an estimated 78,000 (or 64%) would ever secure employment as teachers in public or private schools. It is common to attribute the difficulty experienced in recruiting entering teachers to noncompetitive salaries, difficult working conditions, and unappealing geographic locations. Whatever the problems might be, it does seem as though the production of graduates is more than sufficient in gross numbers.

---

[8]The 46,000 increment to the 121,000 degree graduates from Table 22 was computed by multiplying the estimated 45% of degree graduates at the bachelor's level, who were non-degree graduates from teacher preparation programs, times the number of bachelor's degree graduates from teacher preparation programs (105,000 bachelor's graduates for 1993 from Table 5, minus the 1,600 continuing teachers who graduated with a bachelor's degree, times 45% equals approximately 46,000 non degree graduates).

It was observed above that the S/D ratio for general secondary education in public schools in 1993 was very low (0.48, meaning a large shortage). This apparent shortage of graduates in the broad field of secondary education might be due, in considerable part, to a limitation of the IPEDS (the only comprehensive source of national level data about majors completed by all degree graduates) in that it does not record the number of non-degree graduates of teacher preparation programs who prepare for teacher certification (but do not earn education degrees with one of many teacher preparation majors) while simultaneously majoring in an academic discipline (e.g., English, Spanish, mathematics, biology, etc. teachers). The data of Tables 20, 21, and 22 are therefore limited to degree graduates from teacher preparation programs. The shortage of entering secondary teachers, as recorded in Tables 20 - 22) is probably a substantial overestimate.

The bottom halves of Tables 20, 21, and 22 show teacher S/D ratios for the national teaching force, i.e., for public and private schools combined (sample size limitations did not permit a separate analysis of S/D ratios for private schools). Overall, the S/D ratios show a shortage of degree graduates in relation of open teaching positions. However, if the supply is increased by the estimated 46,000 non-degree graduates from teacher preparation programs (as discussed above), the numerical shortage is converted to a surplus. Nonetheless, the circumstances relevant to teacher supply-demand in private schools differ a great deal from those in public schools. First, as seen in the yield percentages of Table 8, the hiring of degree graduates from teacher preparation programs in private schools is much less than that in public schools (proportionate to the number of positions for entering teachers). This may be due partly to the fact that average base salaries of private school teachers are only 67% of those in public schools (Henke, Choy, Geis, & Broughman, 1996). Consequently, many private schools with low salaries may simply not be able to attract professionally prepared teachers. In addition, it is well known that many private schools prefer lay teachers, and, therefore, do not seek to hire professionally prepared teachers. In addition, private schools are not usually subject to the same teacher certification regulations that require public schools to hire, insofar as possible, fully certified teachers. For these reasons, the extent of the authentic private school demand for graduates from teacher preparation programs, or even alternative certification programs, is not clear. No doubt it is less than the 36,000 net open teaching positions recorded in Table 22 for private schools (the 148,700 open positions for public and private schools combined minus the 112,000 open positions for public schools alone).

In summary, it seems that, overall, the production of graduates from teacher preparation programs has been more than sufficient numerically to meet demand. However, there probably have been some continuing shortages in general secondary education, and certainly substantial shortages in special education (as also shown by Boe, Cook, et al., 1998). Even though the overall supply of degree graduates for public school entering teacher demand appears to have been sufficient, that does not mean that there have been enough qualified graduates available to fill open positions in all fields, at all times, and in all locations. The solution to these more specific teacher shortage problems will probably require greater production of teacher graduates in many specific fields (which might be offset with lower production in some other fields), improved teacher recruitment procedures, and improvements in the teaching profession (e.g., salaries, working conditions, etc.) that will generate a much higher yield of teacher preparation graduates for the employed teaching force.

Table 1. *Yield of Total Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools: National Estimates of the Number of Teachers by Yield Components and Graduation Year*

		Graduation Year		
	Statistic[a]	1987	1990	1993
TOTAL GRADUATES		124,032	146,624	153,917
YIELD COMPONENTS				
Annual Yield				
Entering Teachers	National Estimate	35,261	41,029	38,005
	Standard Error Nat'l Estimate	1,478	2,226	1,517
	Sample (n)	697	879	849
	Yield %	28%	28%	25%
Continuing Teachers	National Estimate	34,871	30,654	32,458
	Standard Error Nat'l Estimate	1,662	2,012	1,810
	Sample (n)	587	553	562
	Yield %	28%	21%	21%
Subtotal: Annual Yield	Yield %	56%	49%	46%
Delayed Yield				
Entering First-Time Teachers	National Estimate	22,494	32,757	40,907
	Standard Error Nat'l Estimate	1,264	2,025	1,975
	Sample (n)	411	688	853
	Yield %	18%	22%	27%
Total Yield	National Estimate	92,626	104,440	111,370
	Standard Error Nat'l Estimate	2,503	3,597	3,351
	Sample (n)	1,695	2,120	2,264
	Yield %	75%	71%	72%
	95% Confidence Limits	71% - 79%	66% - 76%	68% - 77%

Note. Data from the 1987-88, 1990-91 and 1993-94 Schools and Staffing Survey and the 1986-87, 1989-90, and 1992-93 Integrated Postsecondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate=standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

Table 2. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools (1987): National Estimates of the Number of Teachers by Yield Components in Five Teacher Preparation Fields*

		Annual Graduates (1987) by Teacher Preparation Fields*					
	Statistic[a]	General Elementary	General Secondary	Physical/ Health	Vocational/ Business	Special Education	Total
TOTAL GRADUATES		57,321	22,931	18,179	9,985	15,616	124,032
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	18,894	8,345	1,909	--[b]	5,232	35,261
	Standard Error Nat'l Estimate	1,266	597	347	--[b]	704	1,478
	Sample (n)	356	180	43	27	91	697
	Yield %	33%	36%	11%	9%	33%	28%
Continuing Teachers	National Estimate	17,613	8,076	1,430	--[b]	6,410	34,871
	Standard Error Nat'l Estimate	1,136	810	297	--[b]	713	1,662
	Sample (n)	260	153	31	28	115	587
	Yield %	31%	35%	8%	13%	41%	28%
Total Annual Yield	Yield %	64%	71%	19%	22%	74%	56%
Delayed Yield							
Entering First-Time Teachers	National Estimate	11,986	5,737	2,182	--[b]	--[b]	22,494
	Standard Error Nat'l Estimate	975	557	435	--[b]	--[b]	1,264
	Sample (n)	196	123	37	29	26	411
	Yield %	21%	25%	12%	14%	8%	18%
Total Yield	National Estimate	48,493	22,158	5,521	3,599	12,854	92,626
	Standard Error Nat'l Estimate	1,770	1,285	519	394	1,010	2,503
	Sample (n)	812	456	111	84	232	1,695
	Yield %	85%	97%	30%	36%	82%	75%
	95% Confidence Limits	79% - 91%	86% - 108%	25% - 36%	28% - 44%	70% - 95%	71% - 79%

Note. Data from the 1987-88 Schools and Staffing Survey and the 1986-87 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

[b]Sample too small ($n < 30$) for computing a reliable estimate.

*The yield category by teacher preparation program (3 x 5) χ^2 was 33.64 ($p < .01$).

Table 3. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools (1990): National Estimates of the Number of Teachers by Yield Components in Five Teacher Preparation Fields*

		Annual Graduates (1990) by Teacher Preparation Fields*					
	Statistic[a]	General Elementary	General Secondary	Physical/ Health	Vocational/ Business	Special Education	Total
TOTAL GRADUATES		74,704	28,513	18,961	9,021	15,425	146,624
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	22,175	9,421	2,408	1,170	5,855	41,029
	Standard Error Nat'l Estimate	1,610	872	429	225	908	2,226
	Sample (n)	407	269	59	49	95	879
	Yield %	30%	33%	13%	13%	38%	28%
Continuing Teachers	National Estimate	14,240	7,928	1,829	1,088	5,569	30,654
	Standard Error Nat'l Estimate	1,550	846	431	198	643	2,012
	Sample (n)	185	176	37	41	114	553
	Yield %	19%	28%	10%	12%	36%	21%
Total Annual Yield	Yield %	49%	61%	23%	25%	74%	49%
Delayed Yield							
Entering First-Time Teachers	National Estimate	15,357	8,950	3,562	2,971	1,916	32,757
	Standard Error Nat'l Estimate	1,424	845	678	555	510	2,025
	Sample (n)	274	217	87	78	32	688
	Yield %	21%	31%	19%	33%	12%	22%
Total Yield	National Estimate	51,772	26,298	7,800	5,229	13,340	104,440
	Standard Error Nat'l Estimate	2,661	1,666	892	636	1,234	3,597
	Sample (n)	866	662	183	168	241	2,120
	Yield %	69%	92%	41%	58%	86%	71%
	95% Confidence Limits	62% - 76%	81% - 104%	32% - 50 %	44% - 72%	71% - 102%	66% - 76%

Note. Data from the 1990-91 Schools and Staffing Survey and the 1989-90 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

*The yield category by teacher preparation program (3 x 5) χ^2 was 47.92 ($p < .001$).

Table 4. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools (1993): National Estimates of the Number of Teachers by Yield Components in Five Teacher Preparation Fields*

		Annual Graduates (1993) by Teacher Preparation Fields*					
	Statistic[a]	General Elementary	General Secondary	Physical/ Health	Vocational/ Business	Special Education	Total
TOTAL GRADUATES		78,870	32,371	16,978	7,448	18,250	153,917
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	19,369	10,211	3,096	899	4,430	38,005
	Standard Error Nat'l Estimate	1,354	949	526	148	648	1,517
	Sample (n)	342	287	65	40	115	849
	Yield %	25%	32%	18%	12%	24%	25%
Continuing Teachers	National Estimate	15,964	8,504	--[b]	--[b]	6,404	32,458
	Standard Error Nat'l Estimate	1,527	1,031	--[b]	--[b]	1,005	1,810
	Sample (n)	211	173	21	27	130	562
	Yield %	20%	26%	3%	15%	35%	21%
Total Annual Yield	Yield %	45%	58%	21%	27%	59%	46%
Delayed Yield							
Entering First-Time Teachers	National Estimate	18,732	11,516	4,653	3,302	2,705	40,907
	Standard Error Nat'l Estimate	1,300	1,115	757	569	657	1,975
	Sample (n)	328	294	104	82	45	853
	Yield %	24%	36%	27%	44%	15%	27%
Total Yield	National Estimate	54,065	30,231	8,227	5,307	13,538	111,370
	Standard Error Nat'l Estimate	2,576	1,806	966	644	1,597	3,351
	Sample (n)	881	754	190	149	290	2,264
	Yield %	69%	93%	48%	71%	74%	72%
	95% Confidence Limits	62% - 75%	82% - 104%	37% - 60%	54% - 88%	57% -91%	68% - 77%

Note. Data from the 1993-94 Schools and Staffing Survey and the 1992-93 Integrated Postsecondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

[b]Sample too small (n<30) for computing a reliable estimate.

*The yield component by teacher preparation field (3 x 5) χ^2 is 64.81 ($p < .001$).

Table 5. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools: National Estimates of the Number of Teachers by Yield Component, Degree Level, and Year*

		Annual Graduates by Year and Degree Level*					
		1987		1990		1993	
	Statistic[a]	Bachelor's	Master's	Bachelor's	Master's	Bachelor's	Master's
TOTAL GRADUATES		83,673	40,359	101,293	45,331	104,714	49,203
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	29,678	5,583	35,061	5,968	32,007	5,998
	Standard Error Nat'l Estimate	1,205	807	1,946	1,016	1,420	644
	Sample (n)	602	95	782	97	713	136
	Yield %	35%	14%	35%	13%	31%	12%
Continuing Teachers	National Estimate	4,132	30,739	1,551	29,103	1,610	30,848
	Standard Error Nat'l Estimate	484	1,579	299	1,968	275	1,832
	Sample (n)	81	506	39	514	55	507
	Yield %	5%	76%	2%	64%	2%	63%
Total Annual Yield	Yield %	40%	90%	37%	77%	33%	75%
Delayed Yield							
Entering First-Time Teachers	National Estimate	20,853	--[b]	30,539	2,218	37,353	3,554
	Standard Error Nat'l Estimate	1,172	--[b]	1,992	604	1,911	397
	Sample (n)	383	28	637	51	768	85
	Yield %	25%	4%	31%	5%	36%	7%
Total Yield	National Estimate	54,663	37,962	67,151	37,289	70,970	40,400
	Standard Error Nat'l Estimate	1,832	1,925	2,446	2,191	2,533	1,832
	Sample (n)	1,066	629	1,458	662	1,536	728
	Yield %	65%	94%	66%	82%	68%	82%
	95% Confidence Limits	61% - 70%	85% - 103%	62% - 71%	73% - 92%	63% - 73%	75% - 89%

Note. Data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey and the 1986-87, 1989-90, and 1992-93 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

[b] Sample too small ($n < 30$) for computing a reliable estimate.

* For 1987-88, the yield component by degree level (3 x 2) χ^2 was 955.51 ($p < .001$). For 1990-91, the yield component by degree level (3 x 2) χ^2 was 611.99 ($p < .001$). For 1993-94, the yield component by degree level (3 x 2) χ^2 was 998.95 ($p < .001$).

Table 6. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools: National Estimates of the Number of Teachers by Yield Component, Sex, and Year*

		Annual Graduates by Year and Sex*					
		1987		1990		1993	
	Statistic[a]	Male	Female	Male	Female	Male	Female
TOTAL GRADUATES		28,784	95,248	31,599	115,025	32,664	121,253
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	6,201	29,060	8,246	32,783	8,927	29,078
	Standard Error Nat'l Estimate	653	1,599	930	2,010	883	1,252
	Sample (n)	151	546	231	648	241	608
	Yield %	22%	31%	26%	29%	27%	24%
Continuing Teachers	National Estimate	5,984	28,887	5,599	25,055	6,145	26,313
	Standard Error Nat'l Estimate	644	1,466	691	1,858	990	1,658
	Sample (n)	128	459	129	424	130	432
	Yield %	21%	30%	18%	22%	19%	22%
Total Annual Yield	Yield %	43%	61%	44%	51%	46%	46%
Delayed Yield							
Entering First-Time Teachers	National Estimate	5,123	17,371	6,486	26,271	10,613	30,294
	Standard Error Nat'l Estimate	617	1,109	856	1,695	1,025	1,789
	Sample (n)	105	306	181	507	241	612
	Yield %	18%	18%	21%	23%	32%	25%
Total Yield	National Estimate	17,308	75,318	20,331	84,109	25,685	85,685
	Standard Error Nat'l Estimate	1,021	2,515	1,431	3,288	1,712	2,951
	Sample (n)	384	1,311	541	1,579	612	1,652
	Yield %	60%	79%	64%	73%	79%	71%
	95% Confidence Limits	53% - 67%	74% - 84%	55% - 73%	68% - 79%	68% - 89%	66% - 75%

Note. Data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey and the 1986-87, 1989-90, and 1992-93 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

*For 1987-88, the yield component by gender (3 x 2) χ^2 was 1.85 (*ns*). For 1990-91, the yield component by gender (3 x 2) χ^2 was 0.33 (*ns*). For 1993-94, the yield component by gender (3 x 2) χ^2 was 3.93 (*ns*).

Table 7. *Yield of Degree Graduates from Teacher Preparation Programs for the National Teaching Force in Public and Private Schools: National Estimates of the Number of Teachers by Yield Component, Race, and Year*

		Annual Graduates by Year and Race*					
		1987		1990		1993	
	Statistic[a]	White	Non-white	White	Non-white	White	Non-White
TOTAL GRADUATES		102,144	21,888	124,630	21,994	130,829	23,088
YIELD COMPONENTS							
Annual Yield							
Entering Teachers	National Estimate	31,836	3,425	36,303	4,726	32,436	5,569
	Standard Error Nat'l Estimate	1,482	508	2,112	864	1,307	743
	Sample (n)	639	58	775	104	731	118
	Yield %	31%	16%	29%	21%	25%	24%
Continuing Teachers	National Estimate	31,301	3,570	27,563	3,090	27,623	4,834
	Standard Error Nat'l Estimate	1,611	599	1,987	581	1,665	1,044
	Sample (n)	530	57	486	67	484	78
	Yield %	31%	16%	22%	14%	21%	21%
Total Annual Yield	Yield %	62%	32%	51%	35%	46%	45%
Delayed Yield							
Entering First-Time Teachers	National Estimate	20,486	2,008	28,516	4,241	35,578	5,329
	Standard Error Nat'l Estimate	1,088	552	1,820	737	1,876	752
	Sample (n)	374	37	603	85	746	107
	Yield %	20%	9%	23%	19%	27%	23%
Total Yield	National Estimate	83,623	9,003	92,382	12,057	95,637	15,733
	Standard Error Nat'l Estimate	2,400	897	3,325	1,133	2,950	1,639
	Sample (n)	1,543	152	1,864	256	1,961	303
	Yield %	82%	41%	74%	55%	73%	68%
	95% Confidence Limits	77% - 86%	33% - 49%	69% - 79%	45% - 65%	69% - 78%	54% - 82%

Note. Data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey and the 1986-87, 1989-90, and 1992-93 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate. Total Yield % may not sum exactly due to rounding.

*For 1987-88, the yield component by race (3 x 2) χ^2 was 2.92 (*ns*). For 1990-91, the yield component by race (3 x 2) χ^2 was 0.92 (*ns*). For 1993-94, the yield component by race (3 x 2) χ^2 was 0.59 (*ns*).

Table 8. *Yield of Entering Teachers Produced by Degree Graduates from Teacher Preparation Programs, and the Percentage of Continuing Teachers Who Earn Teacher Preparation Degrees Annually, as a Function of Sector (Public vs. Private Schools): National Estimates of the Number of Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Sector (Three Years Combined)		
	Statistic[a]	Public	Private	Total
NET GRADUATES[b]		251,669	74,922	326,591
Entering Teachers				
Recent Graduates	National Estimate	97,572	16,723	114,295
	Standard Error Nat'l Estimate	2,510	963	2,832
	Sample (n)	1,907	518	2,425
	Yield %	39%	22%	35%
Delayed Entrants (First-Time)	National Estimate	78,431	17,727	96,157
	Standard Error Nat'l Estimate	3,128	935	3,203
	Sample (n)	1,507	445	1,952
	Yield %	31%	24%	29%
Total Entering Yield	National Estimate	176,003	34,450	210,453
	Standard Error Nat'l Estimate	3,705	1,429	4,063
	Sample (n)	3,414	963	4,377
	Yield %	70%	46%	64%
	95% Confidence Limits	67%-73%	42%-50%	62%-67%
Continuing Teachers				
Total Continuing	National Estimate	6,984,110	896,138	7,880,249
Recent Graduates[c]	National Estimate	88,074	9,909	97,982
	% of Total Continuing	1.3%	1.1%	1.2%
	Standard Error %	0.05%	0.09%	0.05%
	Sample (n)	1,489	213	1,702

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), and combined data from the 1987, 1990, and 1993 Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics, USDE.

[a]Nationally-weighted estimates (National Estimate) of the number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error Nat'l Estimate = standard error of the national estimate.

[b]Net graduates refers to the total number of degree graduates of teacher preparation programs (as recorded by IPEDS) minus the nationally-estimated number of these graduates who were employed as teachers at the time of graduation (as recorded by SASS). The net number of graduates were those potentially available to be hired as entering teachers. Total net degree graduates were allocated to the two levels of the sector variable in accordance with the percentage at each level of total open positions for entering teachers in the entire teaching force.

[c]Continuing teacher recent graduates were the nationally-estimated number of employed teachers who graduated with a degree from a teacher preparation program during the three years under study. These graduates, if added to the net graduates defined above, equal the total number of degree graduates of teacher preparation programs.

Table 9. *Yield of Entering Teachers Produced by Degree Graduates from Teacher Preparation Programs, and the Percentage of Continuing Teachers Who Earn Teacher Preparation Degrees Annually, as a Function of Sector (Public vs. Private Schools) and Teaching Assignment Level (Elementary vs. Secondary): National Estimates of the Number of Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Teaching Level By Sector (Three Years Combined)			
		Public		Private	
	Statistic[a]	Elementary	Secondary	Elementary	Secondary
NET GRADUATES[b]		138,418	113,251	45,702	29,220
Entering Teachers					
Recent Graduates	National Estimate	61,220	36,353	13,078	3,644
	Standard Error Nat'l Estimate	2,459	1,503	798	450
	Sample (n)	882	1,025	403	115
	Yield %	44%	32%	29%	12%
Delayed Entrants (First-Time)	National Estimate	48,040	30,390	12,502	5,225
	Standard Error Nat'l Estimate	2,717	1,099	824	607
	Sample (n)	665	842	329	116
	Yield %	35%	27%	27%	18%
Total Entering Yield	National Estimate	109,260	66,743	25,580	8,870
	Standard Error Nat'l Estimate	3,734	1,604	1,087	818
	Sample (n)	1,547	1,867	732	231
	Yield %	79%	59%	56%	30%
	95% Confidence Limits	74%-84%	56%-62%	51%-61%	25%-36%
Continuing Teachers					
Total Continuing	National Estimate	3,653,875	3,330,236	538,204	357,934
Recent Graduates[c]	National Estimate	51,003	37,070	6,422	3,487
	% of Total Continuers	1.4%	1.1%	1.2%	1.0%
	Standard Error %	0.08%	0.06%	0.11%	0.15%
	Sample (n)	666	823	145	68

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), and combined data from the 1987, 1990, and 1993 Integrated Postsecondary Education Data system (IPEDS), National Center for Education Statistics, USDE.

[a]Nationally-weighted estimates (National Estimate) of the number of full-time and part-time teachers combined. Standard Error Nat'l Estimate = standard error of the national estimate.

[b]Net graduates refers to the total number of degree graduates of teacher preparation programs (as recorded by IPEDS) minus the nationally-estimated number of these graduates who were employed as teachers at the time of graduation (as recorded by SASS). The net number of graduates were those potentially available to be hired as entering teachers. Total net degree graduates were allocated to the four categories of the sector by teaching level variables in accordance with the percentage for each category to total open positions for entering teachers in the entire teaching force.

[c]Continuing teacher recent graduates were the nationally-estimated number of employed teachers who graduated with a degree from a teacher preparation program during the three years under study. These graduates, if added to the net graduates defined above, equal the total number of degree graduates of teacher preparation programs.

Table 10. *Yield of Entering Teachers Produced by Degree Graduates from Teacher Preparation Programs, and the Percentage of Continuing Teachers Who Earn Teacher Preparation Degrees Annually, as a Function of Sector (Public vs. Private Schools) and School Size: National Estimates of the Number of Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		School Size By Sector (Three Years Combined)					
		Public			Private		
	Statistic[a]	Small	Medium	Large	Small	Medium	Large
NET GRADUATES[b]		67,951	88,084	95,634	57,690	11,238	5,994
Entering Teachers							
Recent Graduates	National Estimate	26,062	35,397	30,423	13,032	1,466	--[d]
	SE Nat'l Estimate	1,633	1,841	1,729	845	250	171
	Sample (n)	703	547	558	410	46	19
	Yield %	38%	40%	32%	23%	13%	14%
Delayed Entrants	National Estimate	22,971	25,630	24,840	12,452	2,395	--[d]
(First-Time)	SE Nat'l Estimate	1,468	1,832	1,139	796	331	176
	Sample (n)	561	401	465	333	49	20
	Yield %	34%	29%	26%	22%	21%	18%
Total Entering Yield	National Estimate	49,033	61,026	55,262	25,485	3,861	1,911
	SE Nat'l Estimate	2,143	2,576	1,991	1,202	443	258
	Sample (n)	1,264	948	1,023	743	95	39
	Yield %	72%	69%	58%	44%	34%	32%
	95% CL	66%-78%	64%-75%	54%-62%	40%-48%	27%-42%	23%-40%
Continuing Teachers							
Total Continuing	National Estimate	1,658,562	2,365,290	2,538,110	527,772	162,250	108,772
Recent Graduates[c]	National Estimate	19,828	34,707	27,827	6,501	2,140	--[d]
	% of Total Cont.	1.2%	1.5%	1.1%	1.2%	1.3%	0.7%
	Standard Error %	0.09%	0.08%	0.08%	0.13%	0.29%	0.15%
	Sample (n)	446	462	497	145	39	13

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), and combined data from the 1987, 1990, and 1993 Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics, USDE.

[a]Nationally weighted estimates (National Estimate) of the number of full-time and part-time teachers combined at the K-12 grade levels. SE Nat'l Estimate = standard error of the national estimate. CL = confidence limits.

[b]Net graduates refers to the total number of degree graduates of teacher preparation programs (as recorded by IPEDS) minus the nationally-estimated number of these graduates who were employed as teachers at the time of graduation (as recorded by SASS). The net number of graduates were those potentially available to be hired as entering teachers. Total net degree graduates were allocated to the six levels of the sector by school size variables in accordance with the percentage for each level of total open positions for entering teachers in the entire teaching force.

[c]Continuing teacher recent graduates were the nationally-estimated number of employed teachers who graduated with a degree from a teacher preparation program during the three years under study. These graduates, if added to the net graduates defined above, equal the total number of degree graduates of teacher preparation programs.

[d]Sample too small (n < 30) for computing a reliable estimate.

Table 11. *Yield of Entering Teachers Produced by Degree Graduates from Teacher Preparation Programs, and the Percentage of Continuing Teachers Who Earn Teacher Preparation Degrees Annually, as a Function of Sector (Public vs. Private Schools) and Community Type of School Location (Rural, Suburban, and Urban): National Estimates of the Number of Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Community Type By Sector (Three Years Combined)					
		Public			Private		
	Statistic[a]	Rural	Suburban	Urban	Rural	Suburban	Urban
NET GRADUATES[b]		108,218	72,984	70,467	16,483	28,470	29,969
Entering Teachers							
Recent Graduates	National Estimate	45,203	23,969	25,954	4,105	5,502	6,610
	SE Nat'l Estimate	1,734	1,300	1,753	401	577	610
	Sample (n)	1,130	390	354	139	165	197
	Yield %	42%	33%	37%	25%	19%	22%
Delayed Entrants	National Estimate	37,951	19,876	19,715	4,156	6,193	7,014
(First-Time)	SE Nat'l Estimate	2,001	1,501	1,252	415	607	658
	Sample (n)	860	320	316	111	142	182
	Yield %	35%	27%	28%		22%	23%
Total Entering Yield	National Estimate	83,154	43,845	45,670	8,262	11,695	13,623
	SE Nat'l Estimate	2,189	1,899	2,048	536	923	930
	Sample (n)	1,990	710	670	250	307	379
	Yield %	77%	60%	65%	50%	41%	45%
	95% CL	75%-79%	55%-65%	59%-71%	44%-56%	35%-47%	39%-52%
Continuing Teachers							
Total Continuing	National Estimate	2,775,547	2,076,722	1,925,571	173,914	314,877	377,169
Recent Graduates[c]	National Estimate	37,366	20,391	27,509	1,912	3,252	4,583
	% of Total Cont.	1.4%	1.0%	1.4%	1.1%	1.0%	1.2%
	Standard Error %	0.07%	0.07%	0.11%	0.23%	0.17%	0.16%
	Sample (n)	753	324	376	47	65	95

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), and combined data from the 1987, 1990, and 1993 Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics, USDE.

[a]Nationally-weighted estimates (National Estimate) of the number of full-time and part-time teachers combined at the K-12 grade levels. SE Nat'l Estimate = standard error of the national estimate. CL = confidence limits.

[b]Net graduates refers to the total number of degree graduates of teacher preparation programs (as recorded by IPEDS) minus the nationally-estimated number of these graduates who were employed as teachers at the time of graduation (as recorded by SASS). The net number of graduates were those potentially available to be hired as entering teachers. Total net degree graduates were allocated to the six levels of the sector by community type variables in accordance with the percentage for each level of total open positions for entering teachers in the entire teaching force.

[c]Continuing teacher recent graduates were the nationally-estimated number of employed teachers who graduated with a degree from a teacher preparation program during the three years under study. These graduates, if added to the net graduates defined above, equal the total number of degree graduates of teacher preparation programs.

Table 12. *Certification Status in Main Teaching Assignment as a Function of Out-of-Field Teaching (i.e., the Mismatch Between Teacher Preparation Degree Field and Teaching Assignment Field): National Estimates of the Number of Teachers By Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Number of Teachers: Match Between Teacher Prep Degree Field, and Teaching Assignment Field		
Yield Components	Certification Status	Match	Mismatch	Total
Annual Yield				
Entering Teachers	Fully Certified	77,460	12,056	89,516
	Partly Certified	19,680	5,099	24,779
	Total	97,141	17,155	114,295
Continuing Teachers	Fully Certified	69,252	17,854	87,105
	Partly Certified	7,519	3,358	10,877
	Total	76,771	21,211	97,982
Delayed Yield				
Entering First-Time Teachers	Fully Certified	55,192	13,977	69,169
	Partly Certified	18,368	8,620	26,988
	Total	73,561	22,597	96,157
Total Yield	Fully Certified	201,905	43,887	245,791
	Partly Certified	45,568	17,076	62,644
	Total	247,472	60,963	308,435

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE. Nationally weighted estimates of the number of full-time and part-time teachers combined at the K-12 grade levels are reported. See Table 6-2 for the percentages of fully and partly certified teachers.

Table 13. *Partly Certified Teachers as a Function of Out-of-Field Teaching (i.e., the Mismatch Between Teacher Preparation Degree Field and Teaching Assignment Field): National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Match Between Teacher Prep Degree Field and Teaching Assignment Field		
Yield Components	Statistic[a]	Match	Mismatch	Total
Annual Yield[b]				
Entering Teachers***	% Partly Certified	20.3%	29.7%	21.7%
	Standard Error %	1.3%	2.5%	1.1%
	Sample (n)	450	138	588
Continuing Teachers*	% Partly Certified	9.8%	15.8%	11.1%
	Standard Error %	1.2%	2.4%	1.1%
	Sample (n)	136	54	190
Delayed Yield[b]				
Entering First-Time Teachers***	% Partly Certified	25.0%	38.2%	28.1%
	Standard Error %	1.2%	3.2%	1.1%
	Sample (n)	372	187	559
Total Yield[b]***	% Partly Certified	18.4%	28.0%	20.3%
	Standard Error %	0.7%	1.6%	0.6%
	Sample (n)	958	379	1,337

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE. See Table 6-1 for the national-weighted estimates of the number of fully and partly certified teachers.

[a]Nationally weighted percentage of partly certified teachers (% Partly Certified) based on the cell total numbers of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the partly certified percentage.

[b]The statistical significance of the differences between the row percentages of partly certified teachers (% Partly Certified) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Match vs. Mismatch by Fully Certified vs. Partly Certified (2 x 2)χ^2 was 11.26 (p<.001). The level of statistical significance computed is indicated by asterisks: $^{*}p$<.05, $^{**}p$<.01, $^{***}p$<.001.

Table 14. *Partly Certified Teachers as a Function of Sector (Public vs. Private Schools): National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Sector		
Yield Components	Statistic[a]	Public	Private	Total
Annual Yield[b]				
Entering Teachers***	% Partly Certified	19.2%	36.2%	21.7%
	Standard Error %	1.3%	2.3%	1.1%
	Sample (n)	363	225	588
Continuing Teachers***	% Partly Certified	9.0%	29.6%	11.1%
	Standard Error %	1.3%	4.2%	1.1%
	Sample (n)	123	67	190
Delayed Yield[b]				
Entering First-Time Teachers***	% Partly Certified	24.1%	45.8%	28.1%
	Standard Error %	1.4%	3.5%	1.1%
	Sample (n)	340	219	559
Total Yield[b]***	% Partly Certified	17.2%	38.6%	20.3%
	Standard Error %	0.7%	1.8%	0.6%
	Sample (n)	826	511	1,337

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of partly certified teachers (% Partly Certified) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the partly certified percentage.

[b]The statistical significance of the differences between the row percentages of partly certified teachers (% Partly Certified) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Public vs. Private by Fully Certified vs. Partly Certified (2 x 2) χ^2 was 41.44 ($p<.001$). The level of statistical significance computed is indicated by asterisks: $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

Table 15. *Partly Certified Teachers as a Function of Teaching Assignment Field of Employment: National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Teaching Assignment Field of Employment					
Yield Components	Statistic[a]	General Elementary	General Secondary	Physical/ Health	Vocational/ Business	Special Education	Total
Annual Yield[b]							
Entering Teachers	% Partly Certified	19.3%	23.9%	32.1%	--[c]	21.2%	21.7%
	Standard Error %	1.5%	2.1%	5.8%		2.7%	1.1%
	Sample (n)	229	209	38	19	93	588
Continuing Teachers	% Partly Certified	9.9%	14.6%	--[c]	--[c]	8.9%	11.1%
	Standard Error %	1.6%	2.4%			1.9%	1.1%
	Sample (n)	66	75	9	5	35	190
Delayed Yield[b]							
Entering First-Time Teachers***	% Partly Certified	23.3%	31.0%	22.7%	29.7%	42.1%	28.1%
	Standard Error %	1.7%	2.1%	5.2%	4.6%	4.3%	1.1%
	Sample (n)	183	217	34	35	90	559
Total Yield[b]**	% Partly Certified	17.7%	23.3%	23.5%	18.0%	21.2%	20.3%
	Standard Error %	0.8%	1.1%	3.2%	2.2%	1.7%	0.6%
	Sample (n)	478	501	81	59	218	1,337

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of partly certified teachers (% Partly Certified) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the partly certified percentage.

[b]The statistical significance of the differences between the row percentages of partly certified teachers (% Partly Certified) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Teaching Assignment Field variable by Fully Certified vs. Partly Certified (5 x 2)χ^2 was 8.46 (*ns*). The level of statistical significance computed is indicated by asterisks: $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

[c]Sample size (n) less than 30.

Table 16. *Partly Certified Teachers as a Function of Degree Level, Sex, and Race of Degree Graduates from Teacher Preparation Programs: National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Degree Level		Sex		Race	
Yield Component	Statistic[a]	Bachelor's	Master's	Male	Female	White	Non-White
Annual Yield[b]							
Entering Teachers	% Partly Certified	22.0%	19.9%	23.8%	21.1%	21.3%	24.7%
	Standard Error %	1.2%	3.0%	2.9%	1.3%	1.2%	3.8%
	Sample (n)	513	75	154	434	510	78
	χ^2 test (2×2)	$\chi^2 = 0.48$ (*ns*)		$\chi^2 = 0.69$ (*ns*)		$\chi^2 = 0.79$ (*ns*)	
Continuing Teachers	% Partly Certified	24.8%	10.0%	14.9%	10.3%	10.0%	19.5%
	Standard Error %	4.6%	1.2%	3.3%	1.1%	1.1%	4.9%
	Sample (n)	43	147	48	142	156	34
	χ^2 test (2×2)	$\chi^2 = 8.51$ ($p<.01$)		$\chi^2 = 1.95$ (*ns*)		$\chi^2 = 3.24$ (*ns*)	
Delayed Yield[b]							
Entering First-Time Teachers	% Partly Certified	28.0%	28.4%	31.6%	27.0%	27.5%	31.9%
	Standard Error %	1.2%	3.1%	2.5%	1.3%	1.3%	3.4%
	Sample (n)	506	53	151	408	470	89
	χ^2 test (2×2)	$\chi^2 = 0.01$ (*ns*)		$\chi^2 = 2.32$ (*ns*)		$\chi^2 = 1.23$ (*ns*)	
Total Yield[b]	% Partly Certified	24.9%	12.7%	24.0%	19.4%	19.6%	25.3%
	Standard Error %	0.8%	0.9%	1.6%	0.6%	0.7%	2.5%
	Sample (n)	1,062	275	353	984	1,136	201
	χ^2 test (2×2)	$\chi^2 = 97.01$ ($p<.001$)		$\chi^2 = 7.52$ ($p<.01$)		$\chi^2 = 4.51$ ($p<.05$)	

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of partly certified teachers (% Partly Certified) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the partly certified percentage.

[b]The statistical significance of the differences between the row percentages of partly certified teachers (% Partly Certified) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Degree Level variable by Fully Certified vs. Partly Certified (2 x 2) χ^2 was 0.48 (*ns*). Similar tests were made for the Sex and Race variables.

Table 17. *Out-of-Field Teaching in Terms of the Mismatch of Teaching Assignment Field of Employment to Teacher Preparation Degree Field as a Function of Sector (Public vs. Private Schools): National Estimates of the Percentage of Mismatched Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Sector		
	Statistic[a]	Public	Private	Total
Annual Yield[b]				
Entering Teachers	% Mismatch	15.2%	14.2%	15.0%
	Standard Error %	1.2%	2.2%	1.1%
	Sample (n)	322	69	391
Continuing Teachers	% Mismatch	21.2%	25.7%	21.7%
	Standard Error %	1.4%	3.5%	1.4%
	Sample (n)	318	51	369
Delayed Yield[b]				
Entering First-Time Teachers	% Mismatch	23.1%	25.3%	23.5
	Standard Error %	1.7%	2.4%	1.4%
	Sample (n)	340	102	442
Total Yield[b]	% Mismatch	19.5%	21.2%	19.8%
	Standard Error %	0.8%	1.9%	0.7%
	Sample (n)	980	222	1,202

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of mismatched teachers (% Mismatch) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the mismatch percentage.

[b]The statistical significance of the differences between the row percentages of mismatched teachers (% Mismatch) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Public vs. Private by Matched vs. Mismatched (2 x 2)χ^2 was 0.17 (*ns*). Likewise, the chi square tests for continuing teachers and delayed entering first-time teachers were not statistically significant.

Table 18. *Out-of-Field Teaching in Terms of the Mismatch of Teaching Assignment Field of Employment to Teacher Preparation Degree Field as a Function of Teaching Assignment Field of Employment: National Estimates of the Percentage of Mismatched Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Teaching Assignment Field of Employment					
Yield Components	Statistic[a]	General Elementary	General Secondary	Physical/ Health	Vocational/ Business	Special Education	Total
Annual Yield[b]							
Entering Teachers***	% Mismatch	4.1%	27.4%	--[c]	--[c]	24.1%	15.0%
	Standard Error %	0.8%	2.3%			3.5%	1.1%
	Sample (n)	41	216	15	16	103	391
Continuing Teachers***	% Mismatch	10.3%	34.8%	--[c]	39.4%	17.5%	21.7%
	Standard Error %	1.7%	2.4%		4.6%	3.0%	1.4%
	Sample (n)	69	183	22	47	48	369
Delayed Yield[b]							
Entering First-Time Teachers***	% Mismatch	14.8%	32.7%	--[c]	--[c]	51.3%	23.5%
	Standard Error %	2.2%	2.5%			5.7%	1.4%
	Sample (n)	90	216	15	17	104	442
Total Yield[b]***	% Mismatch	9.3%	31.5%	11.2%	23.6%	27.6%	19.8%
	Standard Error %	1.0%	1.3%	2.1%	2.6%	2.1%	0.7%
	Sample (n)	200	615	52	80	255	1,202

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of mismatched teachers (% Mismatch) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the mismatch percentage.

[b]The statistical significance of the differences between the row percentages of mismatched teachers (% Mismatch) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Teaching Assignment Field variable by Matched vs. Mismatched (5 x 2)χ^2 was 120.41 ($p<.001$). The level of statistical significance computed is indicated by asterisks: $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

[c]Sample size (n) less than 30.

Table 19. *Out-of-Field Teaching in Terms of the Mismatch of Teaching Assignment Field of Employment to Teacher Preparation Degree Field as a Function of Degree Level, Sex, and Race of Degree Graduates from Teacher Preparation Programs: National Estimates of the Percentage of Mismatched Teachers by Three Yield Components for Three SASS Years Combined (1987-88, 1990-91, and 1993-94)*

		Degree Level		Sex		Race	
Yield Component	Statistic[a]	Bachelor's	Master's	Male	Female	White	Non-White
Annual Yield[b]							
Entering Teachers	% Mismatch	15.1%	14.3%	18.7%	14.1%	15.0%	14.8%
	Standard Error %	1.2%	2.9%	2.1%	1.3%	1.3%	2.8%
	Sample (n)	346	45	109	282	340	51
	χ^2 test (2×2)	χ^2 test = 0.07 (*ns*)		χ^2 test = 3.75 (*ns*)		χ^2 test = 0.01 (*ns*)	
Continuing Teachers	% Mismatch	20.6%	21.7%	21.2%	21.8%	21.8%	20.5%
	Standard Error %	4.5%	1.3%	3.0%	1.6%	1.5%	3.5%
	Sample (n)	36	333	80	289	323	46
	χ^2 test (2×2)	χ^2 test = 0.08 (*ns*)		χ^2 test = 0.02 (*ns*)		χ^2 test = 0.12 (*ns*)	
Delayed Yield[b]							
Entering First-Time Teachers	% Mismatch	22.9%	30.4%	19.9%	24.6%	23.1%	26.4%
	Standard Error %	1.5%	4.8%	1.7%	1.6%	1.4%	4.3%
	Sample (n)	404	38	118	324	385	57
	χ^2 test (2×2)	χ^2 test = 2.34 (*ns*)		χ^2 test = 5.34 ($p<.05$)		χ^2 test = 0.56 (*ns*)	
Total Yield[b]	% Mismatch	18.9%	21.2%	19.8%	19.8%	19.7%	20.2%
	Standard Error %	0.9%	1.2%	1.2%	0.8%	0.8%	2.1%
	Sample (n)	786	416	307	895	1,048	154
	χ^2 test (2×2)	χ^2 test = 2.00 (*ns*)		χ^2 test = 0.00 (*ns*)		χ^2 test = 0.05 (*ns*)	

Note. Combined data from the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey, National Center for Education Statistics, USDE.

[a]Nationally weighted percentage of mismatched teachers (% Mismatch) based on the cell total number of full-time and part-time teachers combined at the K-12 grade levels. Standard Error % = standard error of the partly-certified percentage.

[b]The statistical significance of the differences between the row percentages of mismatched teachers (% Mismatch) was computed by chi square testes. For example, consider the row percentages for Entering Teachers. The Degree Level variable by Matched vs. Mismatched (2 x 2)χ^2 was 0.07 (*ns*). Similar tests were made for the Sex and Race variables.

Table 20. *Surplus or Shortage of Degree Graduates from Teacher Preparation Programs for Entering Teacher Positions (1987): National Estimates of the Number of Teachers in Five Teacher Preparation Fields*

Degree Field	Supply (S): Degree Graduates[a]	Demand (D): Open Positions[b]	Surplus or Shortage (1987)	
			National Estimate: S minus D	Ratio: S/D
Public Schools				
General Elementary	39,708	29,656	10,052	1.34
General Secondary	14,855	31,931	-17,076	0.24
Phys Ed/Health	16,749	2,115	14,634	7.92
Voc Ed/Business	8,643	3,738	4,905	2.31
Special Education	9,206	11,710	-2,504	0.79
Total	89,161	79,150	10,011	1.13
Public/Private Combined				
General Elementary	39,708	44,440	-4,732	0.89
General Secondary	14,855	44,366	-29,511	0.33
Phys Ed/Health	16,749	3,454	13,295	4.85
Voc Ed/Business	8,643	4,188	4,455	2.06
Special Education	9,206	12,984	-3,778	0.71
Total	89,161	109,431	-20,270	0.81

Note. Data from the 1987-88 Schools and Staffing Survey and the 1986-87 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Net degree graduates of teacher preparation programs: total graduates minus graduates who were continuing teachers.

[b]Net entering teacher positions: total entering teacher positions net of those filled by re-entering experienced teachers who were fully certified in their main teaching assignment.

Table 21. *Surplus or Shortage of Degree Graduates from Teacher Preparation Programs for Entering Teacher Positions (1990): National Estimates of the Number of Teachers in Five Teacher Preparation Fields*

Degree Field	Supply (S): Degree Graduates[a]	Demand (D): Open Positions[b]	Surplus or Shortage (1990)	
			National Estimate: S minus D	Ratio: S/D
Public Schools				
General Elementary	60,464	40,523	19,941	1.76
General Secondary	20,585	36,830	-16,245	0.56
Phys Ed/Health	17,132	3,605	13,527	4.75
Voc Ed/Business	7,933	4,429	3,504	1.79
Special Education	9,856	14,062	-4,206	0.70
Total	115,970	99,450	16,520	1.17
Public/Private Combined				
General Elementary	60,464	53,883	6,581	1.12
General Secondary	20,585	54,063	-33,478	0.38
Phys Ed/Health	17,132	5,144	11,988	3.33
Voc Ed/Business	7,933	5,107	2,826	1.55
Special Education	9,856	15,240	-5,384	0.65
Total	115,970	133,437	-17,467	0.87

Note. Data from the 1990-91 Schools and Staffing Survey and the 1989-90 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Net degree graduates of teacher preparation programs: total graduates minus graduates who were continuing teachers.

[b]Net entering teacher positions: total entering teacher positions net of those filled by re-entering experienced teachers who were fully certified in their main teaching assignment.

Table 22. *Surplus or Shortage of Degree Graduates from Teacher Preparation Programs for Entering Teacher Positions (1993): National Estimates of the Number of Teachers in Five Teacher Preparation Fields*

Degree Field	Supply (S): Degree Graduates[a]	Demand (D): Open Positions[b]	Surplus or Shortage (1993)	
			National Estimate: S minus D	Ratio: S/D
Public Schools				
General Elementary	62,906	37,462	25,444	1.68
General Secondary	23,867	49,947	-26,080	0.48
Phys Ed/Health	16,500	5,804	10,696	2.84
Voc Ed/Business	6,341	5,100	1,241	1.24
Special Education	11,846	13,708	-1,862	0.86
Total	121,459	112,018	9,441	1.08
Public/Private Combined				
General Elementary	62,906	50,889	12,017	1.24
General Secondary	23,867	68,239	-44,372	0.35
Phys Ed/Health	16,500	8,853	7,647	1.86
Voc Ed/Business	6,341	5,428	913	1.17
Special Education	11,846	15,294	-3,448	0.77
Total	121,459	148,704	-27,245	0.82

Note. Data from the 1993-94 Schools and Staffing Survey and the 1992-93 Integrated Post-Secondary Education Data System, National Center for Education Statistics, USDE.

[a]Net degree graduates of teacher preparation programs: total graduates minus graduates who were continuing teachers.

[b]Net entering teacher positions: total entering teacher positions net of those filled by re-entering experienced teachers who were fully certified in their main teaching assignment.

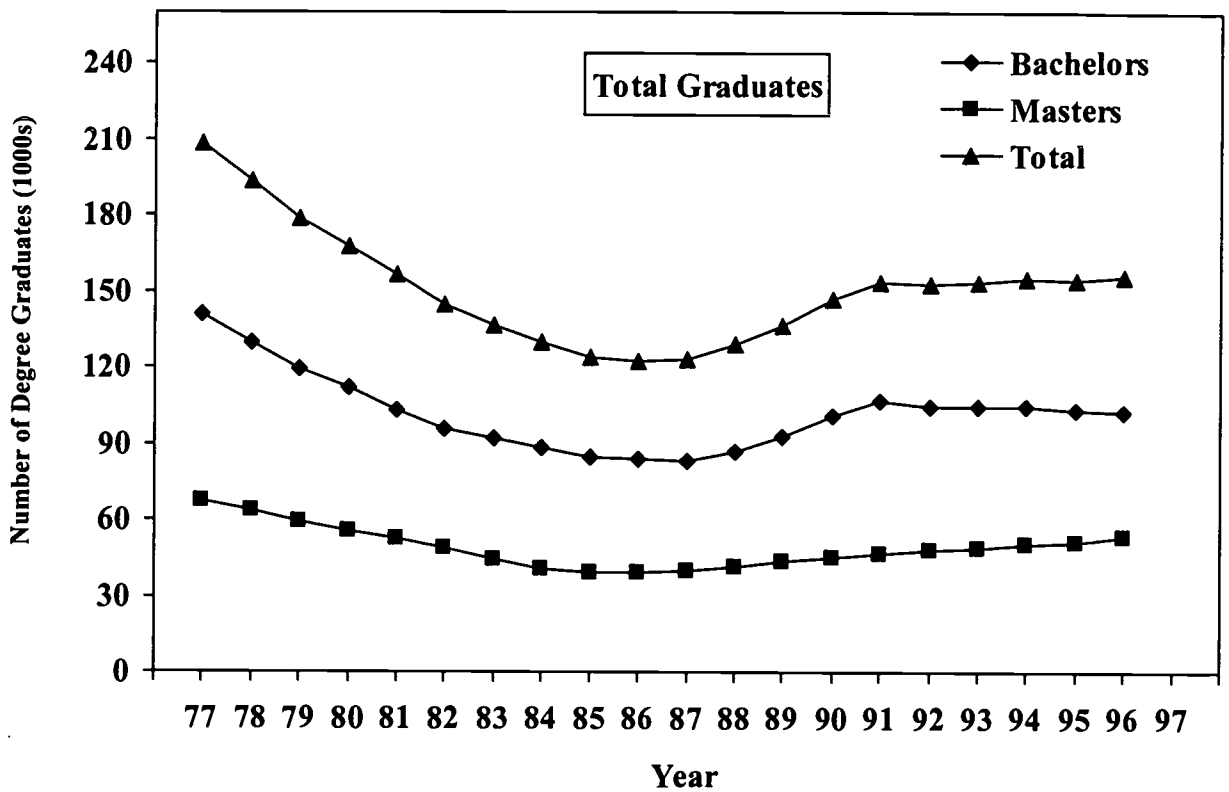

Figure 1. Number of degree graduates (thousands) from teacher preparation programs as a function of year and degree level. Data from the Integrated Postsecondary Education Data System (IPEDS) of the National Center for Education Statistics, USDE.

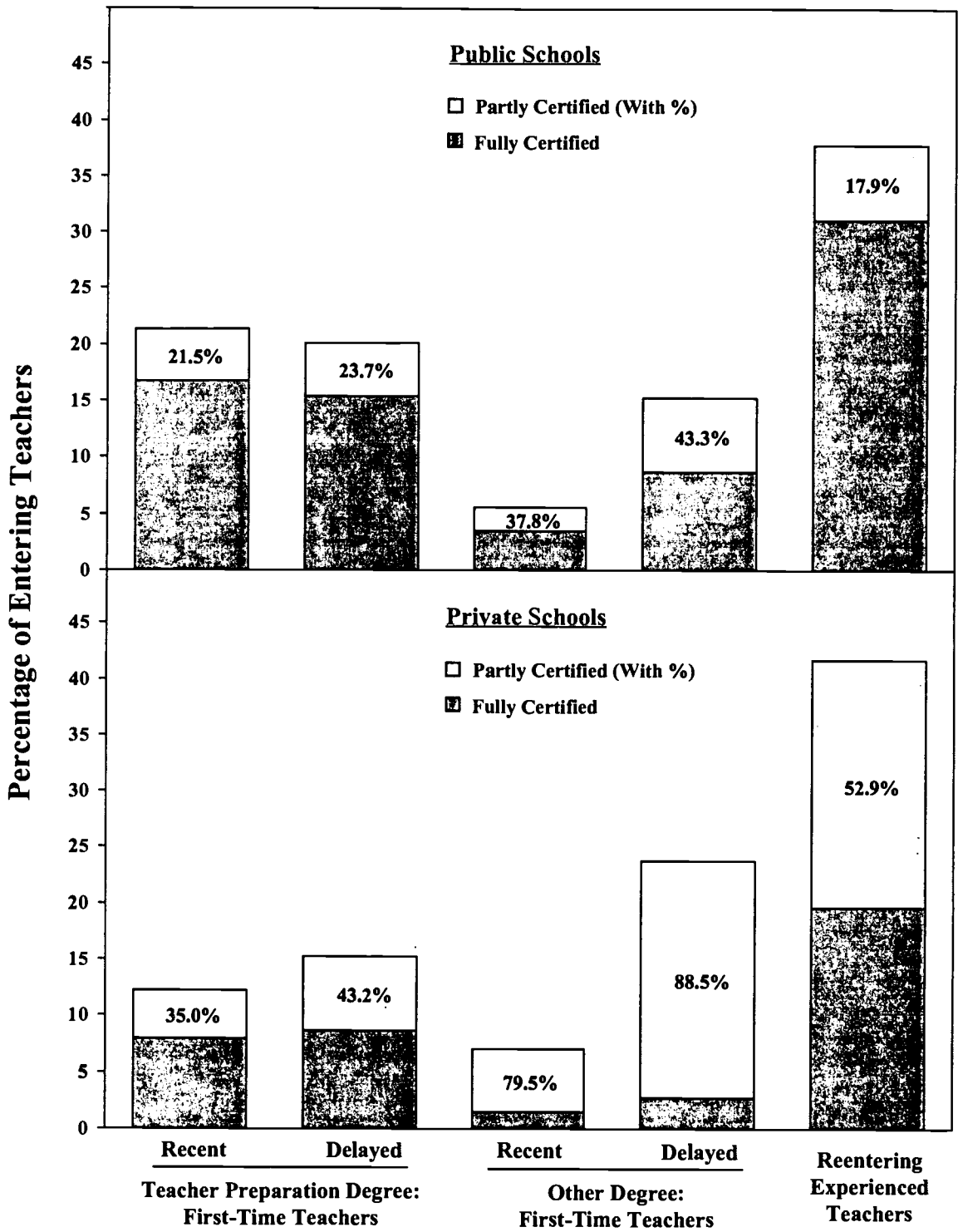

Figure 2. Percentage of total entering teachers as a function of five sources of supply of entering teachers, sector (public vs. private schools), and certification status (fully certified vs. percent partly certified) for school years 1990-91 and 1993-94 combined. The percentage of teachers who were partly certified is shown for each supply source. Data source: The 1990-91 and 1993-94 Schools and Staffing Surveys, the National Center for Education Statistics, USDE.

REFERENCES

Boe, E. E., Bobbitt, S. A., Cook, L. H., Barkanic, G., & Maislin, G. (1998). Supply of Teachers for Eight Cognate Areas: National Trends and Predictors. (Data Analysis Report No. 1998-DAR2). Philadelphia: University of Pennsylvania, Graduate School of Education, Center for Research and Evaluation in Social Policy.

Boe, E. E., Bobbitt, S. A., Cook, L. H., & Weber, A. L. (1998). The production of degree graduates by teacher preparation programs in special and general education: Too much or not enough? From the Series on Teacher Availability in Special Education: Volume 3. Reston, VA: National Clearinghouse for Professions in Special Education

Boe, E. E., Cook, L. H., Bobbitt, S. A., & Terhanian, G. (1998). The shortage of fully-certified teachers in special and general education. Teacher Education and Special Education, 21, 1-21.

Broyles, S. (1994). Integrated Postsecondary Education Data System (IPEDS) (NCES 94-664). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Chaney, B. (1994). The accuracy of teachers' self-reports on their postsecondary education: Teacher transcript study for the Schools and Staffing Survey. (Working Paper No. 94-04). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Choy, S. P., Henke, R. R., Alt, M. N., Medrich, E. A., & Bobbitt, S. A. (1993). Schools and staffing in the United States: A statistical profile, 1990-91. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Choy, S. P., Medrich, E. A., Henke, R. R., & Bobbitt, S. A. (1992). Schools and staffing in the United States: A statistical profile, 1987-88. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Henke, R. R., Choy, S. P., Chen, X., Geis, S., Alt, M. N., & Broughman, S. P. (1997). America's teachers: Profile of a profession, 1993-94. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Henke, R. R., Choy, S. P., Geis, S., & Broughman, S. P. (1996). Schools and staffing in the United States: A statistical profile, 1993-94. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Henke, R. R., Geis, S., Giambattista, J., & Knepper, P. (1996). Out of the lecture hall and into the classroom: 1992-93 college graduates and elementary/secondary school teaching. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Ingersoll, R. M., & Gruber, K. (1996). Out-of-field teaching and educational equality (NCES 96-040). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Kaufman, S., & Huang, H. (1993). 1990-91 Schools and Staffing Survey: Sample design and estimation (NCES 93-449). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

Kennedy, M. (1992). The problem of improving teacher quality while balancing supply and demand. In E. E. Boe & D. M. Gilford (Eds.), Teacher supply, demand, and quality: Policy issues, models and data bases (pp. 65-122). Washington, DC: National Academy Press.

National Center for Education Statistics (1996). An overview of the schools and staffing survey (SASS). Washington, DC: National Center for Education Statistics, U.S. Department of Education.

National Commission on Teaching and America's Future (1996). What matters most: Teaching for America's future. New York: The National Commission on Teaching & America's Future.

Snyder, T. D., Hoffman, C. M., & Geddes, C. M. (1998). Digest of education statistics: 1998. Washington DC: National Center for Education Statistics, U.S. Department of Education.

Southern Regional Education Board & Data and Decision Analysis (1995a). Educator supply and demand in Kentucky: Report on Phase One. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1995b). Educator supply and demand in Oklahoma: Report on Phase Two. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1995c). Educator supply and demand in South Carolina: Report on Phase One. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1996a). Educator supply and demand in Georgia: Report on Phase One. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1996b). Educator supply and demand in Kentucky: Report on Phase Two. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1996c). Educator supply and demand in Tennessee: Report on Phase Two. Atlanta, GA.

Southern Regional Education Board & Data and Decision Analysis (1996d). Educator supply and demand in Texas: Report on Phase Two. Atlanta, GA.

APPENDIX A: DATA SOURCES AND ANALYSIS METHODS

Data Sources

Integrated Postsecondary Education Data System

One source of data for this research was the Integrated Postsecondary Education Data System (IPEDS) of the National Center for Education Statistics (NCES) of the U.S. Department of Education. This data base includes information about a wide variety of variables for the population of colleges and universities, faculty, and students in the United States. It is updated annually. IPEDS data used here were the number and characteristics of annual degree graduates from teacher preparation programs, particularly during school years 1986-87, 1989-90, and 1992-93. An IPEDS school year is counted from July of one year through June of the next year. More detailed information about IPEDS is provided by Broyles (1994).

It should be emphasized that IPEDS specifically records degree majors in various fields of teacher preparation and in many other fields/disciplines. However, neither IPEDS nor any other national data base records the number of college graduates who complete teacher certification programs. There are many graduates who earn degrees in disciplines such as mathematics or English, and who simultaneously complete teacher certification programs leading to teacher employment. For example, state regulations in California, Texas, and Colorado prohibit institutions of higher education from offering degree majors in teaching fields, but they do offer teacher certification preparation. Consequently, the number of degrees earned in teacher preparation programs represents only the major part of the production of qualified teachers produced by teacher preparation programs (see discussion on page 4).

School Teacher Questionnaires: Schools and Staffing Surveys

The second source of data was teachers' self reports to the Public and Private School Teacher Questionnaires (TQs) of the 1987-88, 1990-91, and 1993-94 Schools and Staffing Survey (SASS), conducted by the National Center for Education Statistics (NCES), U.S. Department of Education. Information from the TQs was used in these analyses to identify employed teachers who had entered teaching during the specific year of each survey and others who had continued as employed teachers from the year prior to each survey. Such teachers were analyzed as a function of teacher preparation background, teaching field, sex, and other variables included in this research.

The TQ data were obtained from three large national-probability samples of K - 12 public and private school teachers as follows:

- Public School Teachers: (N = 56,242 teachers in early 1988, N = 56,051 teachers in early 1991, and N = 56,736 in early 1994) with high weighted response rates (86% in 1988, 90% in 1991, and 88% in 1994).
- Private School Teachers: (N = 11,529 teachers in early 1988, N = 9,166 teachers in early 1991, and N = 11,548 in early 1994) with reasonably high weighted response rates (79% in 1988, 84% in 1991, and 80% in 1994).

Therefore, this data base provides nationally representative estimates of the numbers of public and private school teachers in each of the three survey years, including sources of teacher supply (e.g., entering recent degree graduates, delayed entering degree graduates, reentering experienced teachers, continuing teachers, etc.) and whether their main teaching assignment was in one of five broad teaching fields. Furthermore, there are no missing data for completed TQs because NCES imputed values for item nonresponse. More detailed information about SASS is found in an overview published by NCES (1996), and in SASS technical descriptions (e.g., see Choy, Medrich, Henke, & Bobbitt, 1992, Appendix A for the 1987-88 SASS; Choy, Henke, Alt, Medrich, & Bobbitt, 1993, Appendix C, for the 1990-91 SASS; and Henke, Choy, Geis, & Broughman, 1996, Appendix C, for the 1993-94 SASS).

Samples

Degree Graduates from Teacher Preparation Programs from IPEDS

In its annual surveys of institutions of higher education, IPEDS collects population data on the national number of bachelor's, master's, and doctoral degrees conferred each year by major field of study. For example, such data were reported in Table 253 by sex of graduates for 1995-96 by Snyder, Hoffman, and Geddes (1998). As listed in the first column of Table A-1, the 38 specific major fields of study of teacher preparation majors were classified into five broader categories for the purposes of this research. The numbers of degree graduates recorded by IPEDs, as used in the various analyses of this research, are presented in Figure 1 and the several tables of results.

Teachers from SASS

In keeping with the SASS definition based on teacher's self reports to TQs, a teacher is any individual employed either full-time or part-time at a public or private school who reported his/her main assignment as teaching in any grade(s) K - 12, including itinerant teachers and

Table A-1. *Parallel Lists of Specific Major Fields of Study of Degree Graduates from Teacher Preparation Programs as Coded in IPEDS and in SASS and Teaching Assignment Fields as Coded in SASS: Classification of All Fields of Teacher Preparation and Assignment into Five Broad Teaching Fields*

IPEDS Major Fields	SASS Major Fields	SASS Teaching Assignments
1. General Elementary Education		
Pre-elementary education	Pre-elementary educ./early childhood	Kindergarten
Elementary education	Elementary education	General elementary
Junior high/middle school		
Reading education	Reading education	Reading education
Bilingual/bicultural education	Bilingual education	Bilingual education
2. General Secondary Education		
Secondary education	Secondary education	
English education	English education	English/language arts
		Journalism
Mathematics education	Mathematics education	Mathematics education
		Computer science
Science education	Science education	Biology/life science
		Chemistry
		Geology/earth/space science
		Physics
		General/other science
Social science education		
Social studies education	Social studies/social science educ.	Social studies/social science
		Military science
Art education	Art Education	Art education
Music education	Music Education	Music education
		Dance
		Drama/theater

Table A-1 (Continued). *Parallel Lists of Specific Major Fields of Study of Degree Graduates from Teacher Preparation Programs as Coded in IPEDS and in SASS and Teaching Assignment Fields as Coded in SASS : Classification of All Fields of Teacher Preparation and Assignment into Five Broad Teaching Fields*

IPEDS Major Fields	SASS Major Fields	SASS Teaching Assignments
2. General Secondary Education (continued)		
Foreign languages education	Foreign languages education	French German Latin Russian Spanish Other foreign language
Teaching English as a second language	English as a second language	English as a second language
Education of the gifted and talented		Gifted
Remedial education		Basic skills/remedial education
Driver and safety education		
	Crosscultural education	
	Indian education (Native American)	American Indian studies
	Religious education	Religion Philosophy
Teacher education, other		All others
3. Physical/Health Education		
Physical education Health education	Physical education/health education	Physical education/health

Table A-1 (Continued). *Parallel Lists of Specific Major Fields of Study of Degree Graduates from Teacher Preparation Programs as Coded in IPEDS and in SASS and Teaching Assignment Fields as Coded in SASS: Classification of Fields of Teacher Preparation and Assignment into Five Broad Teaching Fields*

IPEDS Major Fields	SASS Major Fields	SASS Teaching Assignments
4. Vocational/Business Education		
Industrial arts education	Industrial arts, vocational and technical, trade and industry education	Industrial arts
Marketing and distributive education	Business, commerce, and distributive educ.	Business/marketing
Technical education		Technical
Trade and industrial education		Trade and industry
Business education		
Agricultural education		Agricultural
Home economics education	Home economics education	Home economics
		Accounting
		Health occupations
		Other vocational education
5. Special Education		
Special education, general	Special education, general	Special education, general
Education of the deaf and hearing impaired	Deaf and hard-of-hearing	Deaf and hard-of hearing
Education of the emotionally handicapped	Emotionally disturbed	Emotionally disturbed
Education of the mentally handicapped	Mentally retarded	Mentally retarded
Education of the multiple handicapped		
Education of the physically handicapped	Orthopedically impaired	Orthopedically impaired
Education of the visually handicapped	Visually handicapped	Visually handicapped
Special learning disabilities	Specific learning disabilities	Specific learning disabilities
Speech correction	Speech/language impaired	Speech/language impaired
	Mildly handicapped	Mildly handicapped
	Severely handicapped	Severely handicapped
Special education, other	Other special education	Other special education

long-term substitutes. Excluded from this definition of a teacher were respondents who identified their main assignment as pre-kindergarten teacher, short-term substitute, student teacher, teacher aide, or a non-teaching specialist of any kind.

The sizes of the samples of teachers used in the various analyses are presented in the several tables of results.

Data Analysis Procedures

Analyses of SASS Data: General Procedures

The tabulation of the number of teachers from SASS for the various analyses reported here was based on the sample sizes reported in Tables 1 through 19 of this report. From these samples, weighted national estimates of the numbers of teachers were computed by special procedures developed by NCES for complex sample survey data (Kaufman & Huang, 1993). Because SASS data are subject to design effects due to stratification and clustering of the sample, standard errors for the national estimates were computed using replicate weights generated by the method of balanced repeated replications with the statistical software "WesVarPC".

Computation of Total Yield and Its Three Components (Tables 1 -7, 12 - 19)

The computation of the yield of degree graduates from teacher preparation programs for the employed teaching force in public and private schools, as a percentage of total degree graduates, was accomplished by the following steps:

1. First the number of degree graduates from a teacher preparation program in one school year (e.g., 1992-93) was obtained from IPEDS. This represents the supply of degree graduates.

2. Next, the nationally estimated number of the following three types of teachers were computed from SASS data for the following school year (e.g., 1993-94):

   a. The number of degree graduates from teacher preparation programs in one school year who entered teaching employment during the following school year (i.e, recent graduates who entered teaching employment),

   b. The number of degree graduates from teacher preparation programs in one school year who simultaneously were employed as teachers and who continued as employed teachers during the following school year (i.e., recent graduates who continued teaching employment), and

c. The number of degree graduates from teacher preparation programs who had delayed their first entry into the employed teaching force by more than one year following graduation (delayed entrants to teaching employment).

3. Then, the nationally estimated number of teachers for each of these three types (as obtained from SASS) was computed as a percentage of the total number of degree graduates (as obtained from IPEDS). These percentages quantify each of three yield components.

4. Finally, the total yield percentage was computed as the sum of the three component yield percentages.

A difference between IPEDS and SASS in their definitions of graduation year required an assumption in using IPEDS as the source of data on degree graduates and SASS as the source of data on employed teachers. A graduation year for IPEDS was defined from July of one year through June of the next (e.g., July 1992 through June 1993). As is common, most graduations no doubt occurred during the Spring (May and June 1993). In the Teacher Questionnaires of SASS, employed teachers were asked to report the "calendar year degree received." For example, teacher responses were collected during the Spring Semester of a survey year (e.g., mostly February through April 1994 for the 1993-94 school year). Employed teachers who reported earning a bachelor's or master's degree from a teacher preparation program during the prior calendar year (e.g., 1993) were classified as recent graduates, while entering first-time teachers with such degrees who reported degree completions in any year before the prior year (e.g., 1992 or earlier) were classified as delayed entrants. Using this procedure required the assumption that the number of graduates earning degrees during the period July through December of 1993 were equivalent to the number earning degrees during July through December 1992 (the period actually included in the 1992-93 IPEDS graduation year). Since the substantial majority of graduates complete degrees for the Spring graduation period, the majority of entering teachers begin employment during the start of a school year in August or September, and since the Teacher Questionnaire of SASS has been administered early in the following year, it was assumed that the use of a calendar year to designate the period of graduation was reasonable for the purposes of this research, and more reasonable than any other possible treatment of the data.

The estimation of <u>delayed</u> yield required a special assumption because SASS and IPEDS are cross-sectional surveys instead of longitudinal surveys. Ideally, the number of IPEDS degree graduates in any one year who delayed their entry to teaching employment by more than one year would be based on follow-up data over a considerable number of subsequent

years (i.e., 10 years, or more). Since no such data exist, the following procedures were used to estimate delayed yield:

1. Using SASS data, it was possible to determine which teachers in a particular year under study (e.g., 1993-94) entered teaching employment for the first time with a degree from a teacher preparation program. This group of entering teachers was classified into those whose teacher preparation degrees had been earned within the past year (e.g., the recent graduates from school year 1992-93) and those whose degrees had been earned in all years prior to the past year (i.e., the delayed entrants).
2. The number of delayed entrants thus estimated was then computed as a percentage of degree graduates of teacher preparation programs during the past year to estimate the yield of graduates who had delayed their entry to the employed teaching force.

In the absence of longitudinal data, it is assumed that the delayed yield percentage thus computed in retrospect is a reasonable approximation of the future delayed yield of degree graduates during a particular year (e.g., 1992-93). In fact, it is the only projection available.

As described below, yield and its three components were also computed separately for four attributes of degree graduates: their teacher preparation field, degree level, sex, and race.

Five Teacher Preparation Fields: Definitions (Tables 2-4, 20 -22)

Because one of the objectives of this research was to study the yield of degree graduates from teacher preparation programs as a function of the major field of preparation, it was necessary that (a) the codes for major fields of teacher preparation classified by IPEDS (the source of data on the supply of degree graduates) correspond with (b) the codes for major fields of study classified by SASS (the source of data on degree graduates who became employed as teachers). For example, as to recent degree graduates who majored in elementary education during one year, it was essential to determine how many such recent graduates with elementary education majors were identified by SASS as entering or continuing teachers during the following year. Thus, the coding for the majors of degree graduates from IPEDS had to correspond with the coding for degree majors of employed teachers from SASS.

Another objective was to study the relationship between the major fields of teacher preparation of degree graduates and the subsequent teaching assignment fields of those who became employed as teachers (i.e., match or mismatch). Therefore, it was necessary that the codes for major fields of teacher preparation classified by IPEDS correspond with the codes for teaching assignment fields classified by SASS. Overall, three sets of fields had to be defined, all of which closely corresponded with each other: (a) major field of teacher

preparation as coded in IPEDs, (b) major field of teacher preparation as coded in SASS, and (c) main teaching assignment field also as coded in SASS.

An examination of the coding of major fields of study by IPEDS and the coding of major fields of study and of teaching assignment by SASS revealed a number of differences. For example, a major field code in IPEDS is junior high/middle school, whereas SASS does not use this major field code. Similarly, a major field code in IPEDS is secondary education, whereas SASS does not use this as a teaching assignment code (but codes specific subject matters instead). The lack of close correspondence between major field codes in IPEDS and SASS (and the frequent use of "other" codes) restricted the number of teacher preparation fields that could be analyzed with both IPEDS and SASS data. Consequently, it became necessary to define five broad fields of teacher preparation for which all IPEDS and SASS codes could be classified unambiguously. The resulting five broad fields of teacher preparation are shown in the first and second columns of Table A-1, along with classification of the specific major fields of study codes used by both IPEDS and SASS into these five teacher preparation fields.

Degree Level, Sex, and Race of Degree Graduates: Definitions (Tables 5 -7, 16, 19)

The degree level (bachelor's vs. master's), sex (male vs. female), and race (White vs. Non-White) variables for degree graduates are available year-by-year from IPEDS since before 1987, the earliest period included in this study. However, the race variable was first available for 1994-95, at which time White degree graduates represented 85% of the total with Non-White graduates representing the remaining 15%. In the absence of earlier IPEDS data on the racial composition of degree graduates from teacher preparation programs, the same 85%/15% White/Non-White difference was used to estimate of the racial distribution of the supply of such graduates for the three years used in this research (1987, 1990, and 1993).

Computation of Entering Teacher Yield (Tables 8 - 11)

Table 1 shows that a distinction is made between entering teachers (those who assume employment as a teacher in any one year) and continuing teachers (those who continue employment as a teacher from one year to the next). Among entering teachers, there is a further distinction between those who were recent graduates upon entering teaching employment, and delayed entrants who waited more than a year following graduation before becoming employed as teachers. A subsidiary analysis was performed on the yield of entering teachers from among degree graduates from teacher preparation programs as a function of

four school variables. This analysis provided information about the following two indicators of the productivity of teacher preparation programs:

- The yield of entering teachers from among degree graduates from teacher preparation programs net of degree graduates who were already employed as teachers at the time of graduation. Net degree graduates represent the supply of degree graduates who were potential entering teachers.

- The percentage of continuing teachers who recently earned a degree from a teacher preparation program. This percentage is a quantitative index of one major contribution of teacher preparation programs to upgrading the qualifications of the continuing employed teaching force).

To compute yield percentages for entering teachers as a function of school variables such as sector and level, it was necessary to allocate the number of net degree graduates to the different levels of a school variable. For example, consider the allocation of net degree graduates by sector (public vs. private schools). The allocation process entailed the following steps:

- First compute the percentage of openings for total entering teachers by level (i.e., 77% of openings for entering teachers were in public schools, while 23% of the openings were in private schools).

- Next use these percentages to allocate the number of net degree graduates to public and private schools as the "fair share" of potential entering teachers for each.

- Finally, compute the yield of entering teachers for public schools from among their fair share of the supply of degree graduates and the yield of entering teachers for private schools from among their fair share of the supply degree graduates.

This method of computing yield of net degree graduates as a function of school variables provides yield information in relation to, and controlled for, the number of openings for entering teachers.

As described below, entering teacher yield was computed separately for four dimensions of schools: sector, teaching assignment level, school size, and community type.

Sector, Teaching Assignment Level, School Size, and Community Type Variables: Definitions

Entering teacher yield was computed as a function of four school variables: sector (public vs. private schools), teaching assignment level of teachers (elementary vs. secondary), school size (small, medium, or large), and community type (rural, suburban, or urban). The sector and teaching assignment level variables have been coded by NCES and are contained in the

SASS databases (e.g., see Appendix C of Henke, Choy, et al., 1996 for description of these two variables).

Data from the Public School Questionnaires and the Private School Questionnaires of SASS were used to define three levels of the school size variable, as follows:

1. Small schools: Enrollment less than 400 students
2. Medium schools: Enrollment between 400 and 700 students
3. Large schools: Enrollment greater than 700 students

The community type variable in the SASS data base was scaled by seven tiers (large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural). For the 1987-88 SASS, a community type code for each public school teacher was based upon the postal ZIP code of school in which the teacher was employed, and matched to the U.S. Census community size for that ZIP code. For the 1990-91 and 1993-94 SASSs, each public school teacher was given a community type code by matching the postal ZIP code of the school in which the teacher was employed to the LOCALE code on the NCES's Common Core of Data School File. The resulting seven tiers of the community type variable were:

Rural: A place with fewer than 2,500 people or a place designated as rural by Census.

Small town: A town not within a metropolitan area and with a population less than 25,000 but greater than 2,500.

Large town: A town not inside a metropolitan area, with a population greater than or equal to 25,000.

Urban fringe of a mid-size city: Place with a metropolitan area of mid-size city and defined as urban.

Urban fringe of a large city: Place within a metropolitan area of a large city and defined as urban by Census (i.e., within same county).

Mid-size city: Central city of a standardized metropolitan area having a population less than 400,000 and a population density less than 6,000 people per square mile.

Large city: Central city of a standardized metropolitan area having a population greater than or equal to 400,000 or a population density greater than or equal to 6,000 people per square mile.

For this research, these seven tiers of the community type variable were reduced to the following three levels:

1. Rural: rural and small town
2. Suburban: large towns, urban fringe of mid-size city, and urban fringe of large city
3. Urban: mid-size city and large city

Computation of Yield by Teacher Qualifications (Tables 12 - 19)

The yield of degree graduates from teacher preparation programs for the employed teaching force in public and private schools combined were computed by the standard methods (as described above) as a function of the following two dimensions of the qualifications of the graduates for the teaching positions to which they were assigned:

1. The percentages of employed degree graduates who were fully certified, and not fully certified, in their main teaching assignment, and

2. The percentage of employed degree graduates who were placed in a teaching assignment field that matched, and did not match, their teacher preparation field.

These definitions of these two dimensions of teacher qualifications were:

Certification Status. Teachers who hold a regular or standard certificate, an advanced professional certificate, or a probationary certificate (a certificate for teachers who have satisfied all requirements for a regular certificate except for completing a probationary period) in their main teaching assignment are considered to be fully certified. All teachers lacking in this basic qualification for teaching are classified as partly certified in their main teaching assignments. The certification status of employed teachers is computed from SASS data.

Out-of-Field Teaching. The match or mismatch of teacher preparation and teaching assignment field defines whether a teacher is teaching in-field or out-of-field. The classification of teachers into these two categories requires the definition of teaching assignment fields, as described below.

Five Teaching Assignment Fields: Definitions (Tables 15 and 18)

One of the objectives of this research was to study the match or mismatch between the fields of preparation of degree graduates from teacher preparation programs and their subsequent fields of teaching assignment. Matches between fields of preparation and teaching assignment represent "in-field" teaching, while mismatches represent "out-of-field" teaching. Given that five broad fields of teacher preparation were defined (as shown in the first two columns of Table A-1), it was therefore necessary to define five parallel broad teaching assignment fields. This was accomplished by classifying all of the 49 main teaching assignment field codes used by SASS into one of five broad teaching assignment fields that

corresponded with the five broad teacher preparation fields. The classification of the 49 specific teaching assignment codes from SASS into the five broad teaching assignment codes is shown in the third column of Table A-1.

Surplus or Shortage of Degree Graduates: Definitions

This analysis of the surplus or shortage of degree graduates from teacher preparation programs focuses on the demand for entering teachers. Therefore, it does not address the need to upgrade or replace continuing teachers who are not fully certified in their main teaching assignment or are otherwise underqualified. However, to the extent that the employment of such teachers is discontinued at their home schools and they do not find teaching employment at a different school, an increase in the demand for entering teachers to replace them ordinarily occurs (i.e., unless the teaching position is discontinued or filled by a teacher from a different position that has been discontinued).

The surplus or shortage of degree graduates from teacher preparation programs was computed separately for each of five broad teaching field (general elementary, general secondary, physical/health education, vocational/business education, and special education) by the following method:

- To quantify the supply of degree graduates who were potentially available to fill open positions for entering teachers, the number of employed continuing teachers who earned teacher preparation degrees were subtracted from the total number of degree graduates, the difference being referred to as net degree graduates.

- To quantify the demand for degree graduates to fill open positions for entering teachers (both recent degree graduates and delayed entrants) for which they might reasonably be expected to be competitive, the number of open teaching positions for entering teachers that were filled by reentering experienced teachers, who were fully certified in the teaching assignments into which they were hired, was subtracted from the total number of open positions for entering teachers--the difference being referred to as net open teaching positions. In making this adjustment to the total number of open positions for entering teachers, it was assumed that fully certified reentering experienced teachers would be preferred hires over inexperienced recent degree graduates and delayed entrants. The number of open positions remaining would therefore represent the best measure of demand for recent degree graduates and delayed entrants.

For each of five broad teaching fields, the surplus or shortage of supply (i.e., net degree graduates) in relation to demand (i.e., net open teaching positions) was computed by subtracting the number of net degree graduates from the number of net open teaching positions. A positive difference quantified surplus, while a negative difference quantified demand.

In order to compare the magnitude of surplus or shortage of net degree graduates across these five teaching fields, a common index was computed dividing the supply (S) quantity by the demand (D) quantity to generate a S/D ratio for each teaching field. A S/D ratio greater than 1.00 indicated a surplus, while a S/D ratio less than 1.00 indicated a shortage.

APPENDIX B

YIELD ESTIMATE FROM THE BACCALAUREATE AND BEYOND LONGITUDINAL STUDY (B&B)

NCES's Baccalaureate and Beyond Longitudinal Study (B&B) provides a nationally-representative source of data for bachelor's degree graduates during the 1992-93 academic year from which the yield percentage of prepared teachers for the employed national teaching force can be computed. In fact, Henke et al. (1997, Table 8.1) reported B&B data from which it is possible to compute the yield of majors in education (as well as other fields) who have been "prepared as teachers" at the bachelor's degree level. Using the Henke et al. data and definitions, we computed the annual yield of entering first-time teachers from among bachelor's level graduates with majors in education. The resulting 68% yield estimate from the Henke et al. data contrasts sharply with the annual yield (i.e., first year following graduation) of 31% reported here in the next to the last column of Table 5. In this research, the yield percentage pertains to bachelor's degree graduates from teacher preparation programs (also during the same 1992-93 academic year, as well as other years) using NCES's IPEDS and SASS data-bases. In view of these widely different yield estimates, this Appendix has been prepared to describe how the differences in definitions and methods used in the Henke et al. study and in this research could produce such disparate estimates.

For simplicity in description, the two methods for estimating yield will be referred to as:

Method A: Based on IPEDS and SASS data, as described above in Appendix A

Method B: Based on B&B data, as reported by Henke et al. (1997, pp. 96-97)

Data Sources

Method A: Uses national data from the IPEDS survey of the population of annual degree graduates (e.g., for 1992-93), by major field of study, including a large number of teacher preparation majors, at the bachelor's and other degree levels. No data are available on course taking, such as completion of a student teaching course. Entering teachers, who completed a bachelor's degree with a major in a field of teacher preparation during the prior year, are identified by SASS, a cross-sectional survey based on a national probability sample of teachers during an academic year (e.g., for 1993-94).

Method B: Uses data from a national probability sample collected as a longitudinal survey that contains information about degree graduates, by major field of study, including a large number of teacher preparation majors, at the bachelor's degree level during academic year 1992-93. An associated transcript study made it possible to determine which degree graduates had completed a course in student teaching. A one-year longitudinal component of B&B followed these bachelor's degree graduates and determined which of them entered teaching employment within one year of graduation.

Definitions of a Prepared Teacher

Method A: A prepared teacher was defined as a bachelor's or master's (separately) degree graduate in education who majored in a teaching field offered by a teacher preparation program.

Method B: A prepared teacher was defined as either (a) a bachelor's degree graduate in education who completed a course in student teaching, or (b) a bachelor's degree graduate in education who qualified for teacher certification within one year of graduation.[9] No data were reported on the relative proportions of the two subtypes of prepared teachers, nor was the level of certification specified. Apparently included were individuals who qualified for emergency, temporary, or provisional certification, as well as those who qualified for regular or standard certification. Therefore, some of these certified teachers may not have been prepared as teachers during their bachelor's degree study. No standard errors of the nationally estimated number of prepared teachers were provided by Henke et al. (1997)

Yield Computation

Method A: Yield percentage was computed in this research as follows:

> The numerator was the number of entering teachers in 1993-94 with education bachelor's degrees with a major in a field of teacher preparation during the prior year (1992-93) as estimated from SASS data, while
>
> the denominator was the number of degree graduates in 1992-93 with bachelors degrees in education with majors in a field of teacher preparation as reported from IPEDS data.

Therefore, the yield percentage computed was of "bachelor's degree graduates from teacher preparation programs."

---

[9]A prepared teacher, as defined here, earned a bachelor's degree with a major in the field of education. This makes it comparable to the definition used in Method A. However, the same definition of a prepared teacher is applicable to bachelor's degree graduates in all disciplines and fields other than education, and such distinctions are reported by Henke et al. (1998). The focus here is only on bachelor's graduates with education majors.

Method B: Yield percentage can be computed as follows:

> The numerator is the number of first-time entering teachers in 1993-94 who earned bachelor's degrees in education during the prior year (1992-93) and who completed a course in student teaching or who qualified for some level of teacher certification during the year following graduation as estimated from the B&B First Followup Survey and the B&B transcript study, while
>
> the denominator is the number of degree graduates in 1992-93 who earned a bachelor's degrees in education and who completed a course in student teaching or who qualified for some level of teacher certification during the year following graduation as estimated from the B&B First Followup survey and the B&B transcript study.

Therefore, the yield percentage computed was of "bachelor's degree graduates in education who completed a student teaching course or who qualified for some level of teacher certification during the year following graduation."

Conclusion Regarding Different Yield Percentage Estimates

In view of the difference in databases, definitions of a "prepared teacher," and subsequent yield computations, it is not surprising that Methods A and B produce quite different yield estimates. Nonetheless, it is possible that the two sources of data, the IPEDS/SASS pair and the B&B longitudinal survey, could produce similar yield results. However, they would need to be analyzed in parallel with the same definitions of variables and time lines. To do so would entail another research project focused on this objective. As it now stands, two different yield estimates can be produced because the definitions of variables and analytic procedures have been quite different.

APPENDIX C: GLOSSARY[10]

Annual Yield

The yield within one year of graduation of degree graduates from teacher preparation programs for the employed teaching forces in public and private schools. The annual yield is composed of two parts: (a) degree graduates who became entering teachers within one year of graduation and (b) continuing teachers with recent degrees.

Certification Status

See Fully Certified Teachers.

Community Type

Community type was defined as a three-category variable in which communities in which schools were located are scaled in terms of population density from low to high, as follows: (a) Rural (including rural and small town), (b) Suburban (including large town, urban fringe of mid-size city, and urban fringe of large city), and (c) Urban (including mid-size city and large city). The locales included in the three categories are:

Rural: A place with fewer than 2,500 people or a place designated as rural by Census.

Small town: A town not within a metropolitan area and with a population less than 25,000 but greater than 2,500.

Large town: A town not inside a metropolitan area, with a population greater than or equal to 25,000.

Urban fringe of a mid-size city: Place with a metropolitan area of mid-size city and defined as urban.

Urban fringe of a large city: Place within a metropolitan area of a large city and defined as urban by Census (i.e., within same county).

Mid-size city: Central city of a standardized metropolitan area having a population less than 400,000 and a population density less than 6,000 people per square mile.

Large city: Central city of a standardized metropolitan area having a population greater than or equal to 400,000 or a population density greater than or equal to 6,000 people per square mile.

Components of Yield

See Yield Components

---

[10]Operational definitions of variables analyzed in this research are available upon request from the senior author.

Continuing Teachers

Continuing teachers were defined as public school teachers who continued teaching in any school (public or private) from one year to the next.

Continuing teachers with recent degrees

Continuing teachers with recent degrees were defined as continuing teachers in one school year (e.g., 1989-90) who earned a degree from a teacher preparation program during the same school year at the bachelor's or master's levels, and who continued teaching in any public or private school during the subsequent school year (e.g., 1990-91).

Degree Graduates from Teacher Preparation Programs

Degree graduates from teacher preparation programs were defined as either bachelor's or master's degree graduates who majored in any field of teacher preparation listed in the first column of Table A-1 of Appendix A.

Degree Level

Degree level was defined as a dichotomous variable: teachers who had earned a masters degree versus teachers who had earned a bachelors degree.

Delayed Entrants

Delayed entrants were defined as entering first-time teachers whose most recent degree from a teacher preparation program had been conferred more than one year prior to entering teaching. See also First-Time Teachers and Entering Teachers.

Delayed Yield

Delayed yield was defined as the percentage of total degree graduates from teacher preparation programs in any one year who became delayed entrants. See also Delayed Entrants.

Demand for Degree Graduates from Teacher Preparation Programs

The demand for degree graduates to fill open positions for entering teachers for which they (i.e., recent degree graduates and delayed entrants) might reasonably be expected to be competitive was defined as the number of open teaching positions for entering teachers that were not filled by reentering experienced teachers (who were fully certified in the teaching assignments into which they were hired).

Entering Teachers

Entering teachers were defined as individuals who where not teaching in public or private schools during one year, and who were hired to teach in either a public or private school during the following year. Entering teachers include both entering experienced teachers and first-time teachers.

Entering First-Time Teachers Without a Recent Teacher Preparation Degree

As used in this study, entering first-time teachers without a recent teacher preparation degree had earned a degree from a teacher preparation program at either the bachelor's or master's level more than one year prior to entry to the teaching force in either public or private schools. These entering teachers had delayed their entry to the employed teaching force by one or more years after earning such degrees--a group sometimes referred to as delayed entrants. See also First-Time Teachers and Delayed Entrants.

Entering Teachers with Recent Degrees

Entering teachers with recent degrees were defined as those (a) who were not teaching in public or private schools during one school year (e.g., 1989-90), but who were employed as teachers in a public or private school during the subsequent school year (e.g., 1990-91), and (b) who had earned a degree from a teacher preparation program at the bachelor's or master's levels during the year prior to entry (e.g., school year 1989-90). Such entering teachers are sometimes referred to as "recent graduates." They were mostly first-time teachers (i.e., entering teachers without prior teaching experience), while some were experienced teachers (i.e., entering teachers with prior experience as teachers in any field).

Entering Teacher Positions

Entering teacher positions were defined open teaching positions that were not filled by continuing teachers who either remained in the same position from year-to-year, or who transferred to a different position from one year to the next. Entering teacher positions were therefore available for competition to individuals who were not employed as teachers in either public or private schools, and who sought to enter employment as teachers.

Entering First-Time Teachers

Entering first-time teachers were defined as entering teachers who had no prior teaching experience in either public or private schools, other than possibly as teacher aides, student teachers, or short-term substitute teachers.

Entering Experienced Teachers

Entering experienced teachers were defined as entering teachers who had prior experience as regular, itinerant, or long-term substitute teachers in either public or private schools.

Experienced Teachers

Experienced teachers were defined as teachers who had at least one year of experience as a regular, itinerant, or long-term substitute teacher in a public or private school, either full-time or part-time.

First-Time Teachers

First-time teachers were defined as entering teachers with no prior teaching experience other than as teacher aides, student teachers, or short-term substitutes.

First-Time Teachers: Delayed Entrants

See First-time teachers and Delayed Entrants.

First-Time Teachers: Recent Graduates

See First-Time Teachers and Recent Graduates.

Fully Certified vs. Partly Certified Teachers

Most teachers are fully certified in their main teaching assignment as defined by holding a regular or standard certificate, an advanced professional certificate, or a probationary certificate (a certificate for teachers who have satisfied all requirements for a regular certificate except for completing a probationary period). All teachers lacking in this basic qualification for teaching are classified as partly certified in their main teaching assignments. See also Main Teaching Assignment.

General Education vs. Special Education

Special education was defined as a broad teaching field by teachers who reported having a main teaching assignment in one of the 11 SASS specialty codes under special education in the third column of Table A-1 of Appendix A. All other teachers were classified as general education teachers.

Graduation Year

Graduation year was defined differently by IPEDS and SASS. According to IPEDS, a graduation year was a 12-month periods from July one year through June of the following year. According to SASS, the "year degree received" was defined as a calendar year from January through December. See Appendix A, "Data Analysis Procedures: Computation of Total Yield and Its Three Components" for a description of how graduation year was used in analyzing data for this research.

Integrated Postsecondary Education Data System (IPEDS)

IPEDS is an data base entailing a wide variety of variables for the population of colleges and universities, faculty, and students in the United States. The population data are collected annually by the survey method.

Main Teaching Assignment (MTA)

The main teaching assignment of a teacher was defined as a teacher's selection of one of 53 subject matter assignment codes provided by the Public and Private School Teacher Questionnaires of SASS (excluding prekindergarten) as listed in the third column of Table A-1 of Appendix A.

Matched vs. Mismatched Degree Graduates

With respect to degree graduates from teacher preparation programs, the correspondence between their teacher preparation and teaching assignment fields was classified as a match versus a mismatch. If one of five teacher preparation and assignment fields (general elementary, general secondary, physical/health education, vocational/business education, and special education) was the same, there was a match of the two types of fields; if the fields of preparation and assignment differed, there was a mismatch.

Mismatched Degree Graduates

See Matched vs. Mismatched Degree Graduates

National Employed Teaching Force

The national employed teaching force was defined as the group of teachers who were employed in either public or private schools, either part or full time, in any particular school year. See also Teacher.

Net Degree Graduates from Teacher Preparation Programs

Net degree graduates were defined as all graduates who were already employed as teachers at the time of graduation. Net degree graduates thus represent the supply of such degree graduates who were potential entering teachers.

Net Open Teaching Positions

Net open teaching positions were defined as all open positions for entering teachers minus the number of open teaching positions for entering teachers that were filled by reentering experienced teachers (who were fully certified in the teaching assignments into which they were hired). Net open teaching positions represent the number for which degree graduates of teacher preparation programs (i.e., recent degree graduates and delayed entrants) might reasonably be expected to be competitive.

Non-Degree Graduates from Teacher Preparation Programs

Non-degree graduates from teacher preparation programs are individuals to major in some field or disciple other than a specialization in education, but who simultaneously complete a teacher preparation program usually leading to certification as a teacher.

Other Major

A major other than in a field of teacher preparation. See Teacher Preparation Major

Out-of-Field Teaching

A teacher whose broad field of teacher preparation is different than her field of teaching assignment. See also Matched vs. Mismatched Degree Graduates.

Partly Certified Teachers

See Fully Certified vs. Partly Certified Teachers

Productivity of Teacher Preparation Programs

See page 1 and Yield (below)

Qualifications of Degree Graduates

Two measures of the qualifications of degree graduates were used in this research. One was certification status; the other out-of-field teaching. See also Fully Certified vs. Partly Certified Teachers and Out-of-Field Teaching.

Race of Degree Graduates

Race/ethnicity of degree graduates was defined as a dichotomous variable: graduates who were White (non-hispanic), versus all minority graduates.

Recent Graduates

Recent graduates were defined as individuals who earned a college or university degree at the bachelor's or master's level during the most recent one-year period. Of interest here are recent graduates of teacher preparation programs who entered employment as teachers within one year of graduation and recent graduates who were continuing teachers at the time of graduation.

Reentering Experienced Teachers

Reentering experienced teachers were defined as entering teachers in one year who (a) were not employed as teachers in either a public or private school during the prior year, and (b) had prior experience as regular, itinerant, or long-term substitute teachers in either public or private schools. See Experienced Teachers.

School Size

The following three levels of the school size variable were defined for this study:

1. Small schools: Enrollment less than 400 students
2. Medium schools: Enrollment between 400 and 700 students
3. Large schools: Enrollment greater than 700 students

School Year

A school year was defined as the 12-month period of time from July of one year to June of the next year. See also Graduation Year

Schools and Staffing Survey (SASS)

A large scale cross-sectional sample survey of teachers, principals, schools, and school districts in the United States conducted in school years 1987-88, 1990-91, and 1993-94 by the National Center for Education Statistics, USDE. See the "Data Sources" section of Appendix A.

Sector

Sector refers to the dimension of public versus private schools. Public schools are in the public sector, while private schools are in the private sector.

Sex of Degree Graduates

Sex was defined as a dichotomous variable: Degree graduates who were male versus those who were female.

Shortage of Degree Graduates from Teacher Preparation Programs

Shortage was defined as a negative difference when net open teaching positions are subtracted from net degree graduates from teacher preparation programs. See also Net Open Teaching Positions and Net Degree Graduates from Teacher Preparation Programs.

Sources of Teacher Supply

Teachers employed in public and private schools in any particular year come from various sources of supply. Most will be continuing as employed teachers from the prior year (see Continuing Teachers). Others will not have been so employed the prior year, but will be entering teaching employment for that particular year (see Entering Teachers). Entering teachers come from various sources. Some may be first-time teachers (see First-Time Teachers). Of these, some may be recent degree graduates, while others may be delayed entrants (see Recent Graduates and Delayed Entrants). Some may be degree graduates from teacher preparation programs, while others will have graduated with majors in other disciplines or fields (see Degree Graduates from Teacher Preparation Programs). Other entering teachers may have had prior teaching experience (see Reentering Experienced Teachers).

Special Education

See General Education vs. Special Education

Supply of Degree Graduates from Teacher Preparation Programs

The supply of degree graduates from teacher preparation programs for the employed teaching force in public and private schools was defined as the number of such graduates at the bachelor's and master's degree levels that are produced annually.

Surplus of Degree Graduates from Teacher Preparation Programs

Surplus was defined as a positive difference when net open teaching positions are subtracted from net degree graduates from teacher preparation programs. See also Net Open Teaching Positions and Net Degree Graduates from Teacher Preparation Programs.

Teacher

In keeping with the SASS definition, a teacher was any individual employed either full-time or part-time at a school who reported their main assignment as teaching in any grade(s) K - 12, including itinerant teachers and long-term substitutes. Excluded from this definition of a teacher were individuals who identified their main assignment as a pre-kindergarten teacher, short-term substitute, student teacher, teacher aide, and a non-teaching specialist of any kind.

Teacher Preparation Fields

Five broad teacher preparation fields were defined as shown in Table A-1 of Appendix A. The five fields were general elementary education, general secondary education, physical/health education, business/vocational education, and special education.

Teacher Preparation Program

A teacher preparation program is defined as an organized entity at a college or university that provides instruction leading to a bachelor's or master's degree in one of 38 major field of study in teacher preparation recognized by IPEDS, as listed in the first column of Table A-1 of Appendix A.

Teacher Supply

See Sources of Teacher Supply.

Teaching Assignment Field

Teaching field was defined by five broad categories of teaching that represented groupings of related main teaching assignments (see Main Teaching Assignments). The 1990-91 and 1993-94 SASSs recognized 53 main teaching assignment fields in grades K - 12, including one termed "all others." These 53 main teaching assignments were grouped into five broad teaching assignment fields as shown in Table A-1 of Appendix A.

Teaching Assignment Level

Teaching level (i.e., the level at which a teacher taught) was defined as a dichotomous variable based on the grade(s) a teacher was assigned to teach instead of on the type of schools in which they taught: secondary teaching level teachers (mostly 9th through 12th grades) versus elementary level teachers (mostly K through 6th grades). Teaching level was coded by NCES based on a complex set of criteria that assigned 7th and 8th grade teachers to either the secondary or elementary level depending on an algorithm described by Henke, Choy, Geis, & Broughman (1996, Appendix C, p. 201).

Total Degree Graduates

Total degree graduates refers to the total number of degree graduates at the bachelor's and master's levels in any one school year from a teacher preparation program. See also Teacher Preparation Program.

Yield of Degree Graduates from Teacher Preparation Programs

The total yield of degree graduates who majored in any field of teacher preparation was defined as the percentage of bachelor's and master's graduates from such programs who attained employment as teachers in public or private schools. The yield percentage, thus, is an index of the productivity of teacher preparation programs for the employed teaching force. Total yield is subdivided into three "yield components" (see below).

Yield Components

The three yield components contributing to the total yield percentage were:

a. The annual yield of degree graduates who majored in any field of teacher preparation who earned a degree during one school year and who entered the employed teaching force in public or private schools sometime during the following school year,

b. The annual yield of degree graduates who majored in any field of teacher preparation who earned a degree in one school year while simultaneously serving as employed teachers and who continued as teachers during the following school year, and

c. The yield of degree graduates who majored in any field of teacher preparation and who delayed first entering the employed teaching force in public or private schools by more than one year following graduation.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Productivity of Teacher Preparation Programs: Surplus or Shortage in Quantity and Quality of Degree Graduates

Author(s): Boe, Erling E., Cook, Lynne H., Paulson, Christine Andrews, Barkanic, Geena, and Leow, Christine S.

Corporate Source: Center for Research and Evaluation in Social Policy, Graduate School of Education, University of Pennsylvania

Publication Date: Sept 21, 1999

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents	The sample sticker shown below will be affixed to all Level 2A documents	The sample sticker shown below will be affixed to all Level 2B documents
PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 1	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2A	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2B
Level 1 ☒	Level 2A ☐	Level 2B ☐
Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.	Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only	Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature: Erling E. Boe	Printed Name/Position/Title: Erling E. Boe	
Organization/Address: University of Pennsylvania 3700 Walnut St, Phil. PA 19104	Telephone: 215 898-5697	FAX: 215-573-5899
	E-Mail Address: boe@pobox.upenn.edu	Date: Oct 6, 1999

(over)