THE CHRONIC AND INCREASING SHORTAGE OF FULLY-CERTIFIED
TEACHERS IN SPECIAL AND GENERAL EDUCATION

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ABSTRACT

The serious shortage of fully certified teachers in special education (SETs) has been well documented in annual reports by the Office of Special Education Programs (OSEP). The centrality of this indicator of teacher qualifications is embodied in the federal No Child Left Behind Act of 2001 that defined a “highly qualified teacher” by three components: (a) earn at least a bachelor’s degree, (b) be fully certified, (c) and, for teachers of core academic subjects, demonstrate subject matter knowledge in all such subjects taught. Accordingly, it is important to understand trends over time in the serious shortage of fully certified SETs, in comparison with general education teachers (GETs), and how various sources of teacher supply improve, or exacerbate, this shortage.

The main source of national data was teachers' self reports to the most recently available version (1999-2000) of the Public School Teacher Questionnaires (PSTQ)—a component of the Schools and Staffing Survey (SASS). These data make possible the quantification teacher certification (full vs. part) for teachers drawn from all major sources supply: (a) teachers continuing from one school year to the next (continuing teachers), (b) teachers entering the ranks of employed public school teachers in one school year (entering teachers), and (c) subsets of entering teachers such as first-time teachers (with traditional, non-traditional, or no teacher preparation) and reentering experienced teachers. The shortage of fully certified teachers was defined as the number who were only partly certified. National trends over time in teacher shortage were also investigated.

The results indicated that:

1. The chronic shortage of fully certified SETs increased from 7.4% in 1993-94 to 12.2% in 2001-02, and ranged from 2-4% greater than the shortage of fully certified GETs.
2. The number of additional fully-certified SETs needed (i.e., to replace the partly-certified SETs) almost doubled from 27,000 in 1987-88 to 49,000 in 2001-02.
3. Continuing teachers in both special and general education who became established in the same teaching assignment in the same school for two years or more had relatively low and equivalent levels of part certification (about 7.5%).
4. The shortage of fully certified teachers was exacerbated by entering teachers; 44.4% of entering SETs and 31.2% of entering GETs were only partly certified.
5. None of the sources of entering teacher supply yielded a high percentage of SETs with full certification. The best source was reentering experienced teachers (26.8% partly certified).
6. Two sources of entering teachers produced virtually no fully certified teachers (first time teachers with nontraditional teacher preparation or with no teacher preparation).
7. Only 53.1% of first-time entering SETs with traditional teacher preparation were fully certified. However, 71.5% were fully certified if they had degree majors in special education.
8. The shortage of fully certified SETs in their main teaching assignment is not principally due to misassignment of SETs who are fully certified in some other assignment.
9. The shortage of fully certified SETs has been chronic and has increased to about 12.5%.

The chronic and increasing shortage of fully certified SETs has occurred as the production of degree graduates has declined, as the production of teachers by alternative routes has increased, and as the number of teaching positions in special education has grown by almost 30% during a ten-year period from 297,000 positions in 1990-91 to 383,000 in 2000-01.
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Introduction

The shortage of qualified teachers in special education has been widely recognized in the field. For example, the ERIC Clearinghouse on Disabilities and Gifted Education (2001) concluded that "The shortage of qualified special education teachers is critical" (pg. 2). Among several indicators of teacher qualifications (such as degree earned and field of degree major), the most basic is the certification (or licensure) status of teachers. This is because all states require that teachers be fully certified in their teaching assignment (Government Accountability Office, 2004), a requirement that includes earning at least a bachelor’s degree. In this context, “fully certified” (or licensed) means that teachers have qualified for a regular, standard, or advanced teaching certificate, not an emergency, temporary, or provisional certificate, or have had certification waived. Teachers who are not fully certified are referred to as “partly certified.”

The centrality of the requirement for full certification as a teacher qualification is represented in a series of annual reports by the Office of Special Education Programs (OSEP), USDE. Each year for over 20 years, OSEP has reported the numbers of special education teachers (SETs) who are fully certified and not fully certified (see OSEP Annual Reports to Congress, e.g., 2003). In fact, this is the only indicator of SET qualifications reported by OSEP. More recently, the No Child Left Behind Act of 2001 (NCLB) defined a “highly qualified teacher” by three components: (a) earn at least a bachelor’s degree, (b) be fully certified, (c) and, for teachers of core academic subjects, demonstrate subject matter knowledge in all such subjects taught. In view of the centrality of full certification in State and Federal policy, it is important to understand the extent to which teachers in various fields earn this qualification.

Shortage of fully certified teachers is defined by the extent to which teaching positions are not filled by such teachers. This is almost entirely accounted for by employed teachers who have not earned full certification (i.e., are only partly certified), and to a minor amount by positions that are not filled (i.e., left vacant). According to the National Center for Education Statistics (NCES), USDE, only 0.2% of teaching positions in public schools nationwide were unfilled in 1993-94 (the
most recent NCES data) (Henke, et al, 1997). Except for this small percentage, the percentage of partly-certified teachers in filled positions represents the shortage of fully certified teachers. In special education, however, national data for the same year (1993-94) show that 1.1% of teaching positions were unfilled (OSEP, 1998, Section III). Though OSEP has since discontinued reporting the number of vacant teaching positions in special education, it includes them along with partially certified teachers in computing the national shortage of fully certified SETs in its Annual Reports to Congress.

The shortage of fully certified SETs during the past 15 years has been well documented. Based on reports from all states, OSEP reported that 9-10% of all positions for SETs was not filled by fully certified teachers during the school years from 1987-88 through 1995-96 (OSEP, 1998, Section III). Based on three nationally-representative sample surveys conducted by NCES during a similar period of time (1987-88 through 1993-94), Boe, Bobbitt, Cook, & Barkanic (1998) reported that 10-11% of all SETs were partly certified. A third source of data is the SPeNSE national sample survey conducted in 1999-00 by WESTAT (Carlson, Lee, Schroll, Klein, & Willig, 2002; Carlson, Brauen, Klein, Schroll, & Willig, 2002). Using SPeNSE data, we computed a shortage of fully certified SETs of 10.6% (partially certified teachers and vacant positions combined). Thus, all three sources of data agree that the shortage of fully certified SETs has been about 9-11%, from 1987-88 through 1999-00.

The shortage of SETs is observed in other ways as well. For example, other national data on teacher shortage demonstrate that most specializations of special education are found to be "with considerable shortage" in annual surveys by the American Association for Employment in Education (1999). The shortage of SETs is also documented by studies at the state level. Lauritzen (1999) reported a critical shortage of SETs in Wisconsin, and the Southern Region Education Board (SREB) (2001) reported that "A top concern for Tennessee, as for other SREB states, is the need for special education teachers" (pg. 10). At the local level, exceptionally high demand for SETs was seen in 98% of urban school districts (Recruiting New Teachers, 2000).

Since there is no doubt about a serious and chronic shortage of fully-certified SETs, it is important to probe more deeply and examine how shortage varies by source of teacher supply. The most detailed national-level study of this type was reported by Boe, Cook, Bobbitt, and Terhanian (1998) for SETs in comparison with that for general education teachers (GETs). For example, they found that entering SETs (i.e., those recruited from applicants not already employed as teachers) exacer-
bated the shortage of full certified SETs—31.8% of entering SETs were only partly certified whereas only 7.8% of continuing SETs were partly certified. The highest level of part certification (68.4%) was found among first-time SETs who delayed their entry into teaching employment by more than one year after graduation. Nonetheless, this group represented 18% of new hires into special education (i.e., not counting transfers of GETs to special education). In summary, this study demonstrated that only 4.6% of established SETs (those who had been in the same teaching assignment for three or more years) were partly certified, while the main shortage problem occurred with the hiring of entering teachers (31.8%)—even those with majors in a field of teacher preparation.

Yet, much remains to be known about the shortage of fully certified SETs. Analyses of trends in shortage since 1993-94 have not been reported (Boe, Bobbitt, Cook, Barkanic, & Maislin, 1998). Furthermore, much remains to be learned in national perspective about how various sources of teacher supply improve, or exacerbate the serious and chronic shortage of fully certified SETs. For example, nothing has been reported about the certification status of those who enter teaching from the reserve pool in comparison with those who enter soon after completing degree study. Likewise, nothing has been reported about the certification status of those who enter teaching after completing traditional teacher preparation programs in special education in comparison with those who complete nontraditional preparation programs. And nothing has been reported about the considerable number and certification status of first-time SETs who completed their teacher preparation in an area of general education.

Fortunately, the most recent Schools and Staffing Survey (SASS) for school year 1999-00 conducted by the National Center for Education Statistics (NCES), USDE, has been expanded to include data that can be used to analyze all these, and other, issues about the certification status of teachers in special education. Thus, the purpose of this study is to update and expand the earlier study by Boe, Cook, et al. (1998) of teacher certification that was based on national data from 1990-91. More specifically, the central purpose of this new research was to investigate, in national perspective, the certification status of continuing and entering public school SETs drawn from various sources of supply. This includes individuals hired from the reserve pool, and those who recently completed traditional and nontraditional teacher preparation programs. Parallel analyses were conducted to compare the certification status of GETs with SETs. This investigation was intended to identify the major sources of teachers who were not fully certified so that efforts to address teacher shortages will benefit by better information about this important problem.
Method

Data Sources and Teacher Samples

The main data source was teachers' self reports to the most recently available version (1999-2000) of the Public School Teacher Questionnaire (PSTQ), a component of the Schools and Staffing Survey (SASS), conducted by the National Center for Education Statistics (NCES), U.S. Department of Education (USDE). PSTQ provided information directly relevant to this research about teacher supply (e.g., continuing vs. entering teachers), teacher preparation (traditional, non-traditional, vs. none), teaching position (e.g., special vs. general education), and teacher qualifications (e.g., certification status and degrees earned). In addition, data for teacher certification status were obtained from similar versions of the PSTQ from the 1987-88, 1990-91, and 1993-94 administrations of SASS, to permit analyses of trends.

The 1999-00 PSTQ provides nationally representative estimates of the numbers of public school teachers of the various types analyzed in this research. Specifically, the PSTQ data were obtained from a large national probability sample of public school teachers (N = 53,105, including public charter school teachers) with a weighted questionnaire response rate of 83%. This yielded a sample of 44,896 K-12 teachers who completed the PSTQ. There are no missing data for completed PSTQs because NCES imputed values for item nonresponse. More detailed information about the 1999-2000 SASS is found in an overview by NCES (U.S. Department of Education, 2000), and in a technical description by NCES (Gruber, Wiley, Broughman, Strizek, & Burian-Fitzgerald, 2002, Appendix B).

In keeping with the SASS definition, a teacher was any individual who reported being employed either full-time or part-time at a public school with a main assignment 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 pre-kindergarten teacher, short-term substitute, student teacher, teacher aide, or a non-teaching specialist of any kind.

In addition to SASS, longitudinal data on the percentage of fully-certified teachers were obtained from the Data Analysis System (DANS), provided by the Office of Special Education Programs (OSEP), USDE, as contained in a series of “Annual Report to Congress” on the implementation of the Individuals with Disabilities Education Act (e.g., OSEP, 2002).
Design

The research was designed to analyze, from a national perspective, the certification status of the supply of SETs, in comparison with that of GETs, employed in public schools during school year 1999-00. Based on the responses to PSTQ, this research focused on the main supply sources of public school teachers who entered the teaching force in 1999-00, and on two types of teachers who continued in public schools from the prior year. The specific sources of teacher supply, as depicted in Figure 1, are defined below:

1. **Entering teachers.** Entering teachers were defined as individuals who were not teaching in public schools during one school year, and who commenced teaching in a public school during the subsequent school year. Entering teachers were first subdivided into those who were first-time teachers and those who had prior teaching experience.

![System model of sources of supply of public school teachers from school year 1998-99 to 1999-2000.](image-url)

Figure 1. System model of sources of supply of public school teachers from school year 1998-99 to 1999-2000.
a. **Entering teacher supply: First-time teachers.** Entering first-time teachers were those 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. First-time teachers were subdivided into those who had, and those who had not, participated in a teacher preparation program prior to entering teaching.

(1) **With teacher preparation.** Traditional teacher preparation was the predominant type, a defining characteristic of which was the length of practice teaching required. According to data from 50 states and the DC produced by National Association of State Directors of Teacher Education and Certification (2003), 8 weeks of practice teaching is the minimum required for an initial teaching certificate (Table B-8). Information from the American Association of Colleges of Teacher Preparation also indicated that 8 weeks of practice teaching is about the minimum that member Colleges require in their traditional programs (D. Imig, Director, personal communication, April 7, 2003). Given this background and using data provided by PSTQ, two types of teacher preparation were defined:

(a) **With traditional teacher preparation.** Teachers with 10 or more weeks of practice teaching were classified as having completed traditional teacher preparation. In addition, a small number were so classified who completed 5-9 weeks of practice teaching if they also had coursework in instructional materials, coursework in educational psychology, observation of classroom teaching, and received feedback on their teaching.

(b) **With non-traditional teacher preparation.** Other teachers with 1-9 weeks of practice teaching were classified as having completed non-traditional teacher preparation. In addition, a small number were so classified who had no practice teaching, but had received feedback on their teaching, made observation of classroom teaching, and completed coursework in instructional materials and in educational psychology.

(2) **Without teacher preparation.** All other teachers without practice teaching were classified as having no teacher preparation.
b. **Entering teacher supply: Experienced teachers.** Entering experienced teachers were not employed as teachers in public schools during the prior year. Entering experienced teachers were of two subtypes, as follows:

1. **Reentering experienced teachers.** Reentering experienced teachers were former teachers who had left teaching employment in either public or private schools. Such former teachers represent one component of the “Reserve Pool,” a major source of supply of entering teachers. (The other component of the reserve pool is “delayed entrants,” i.e., college graduates who have participated in teacher preparation programs, but who have delayed entering teaching employment by more than one year following their graduation.)

2. **Private school migrant teachers.** Private school migrant teachers are teachers who transferred teaching employment from private to public schools.

2. **Continuing teachers.** Continuing teachers were defined as teachers who were teaching in a public school during one school year, and who continued teaching in a public school during the next school year. A continuing teacher may have continued in the same school and teaching assignment, or may have changed school and/or teaching assignment from one school year to the next school year. Continuing teachers were subdivided into two types representing "stability" in teaching assignments over time, as follows.

a. **Established continuing teachers.** Established teachers were defined as continuing teachers who had remained in one of 64 specific teaching assignment fields recognized by SASS and who had taught in the same school for at least two consecutive years, viz., during the 1998-99 and 1999-00 school years.

b. **Transitional continuing teachers.** Transitional teachers were defined as all continuing teachers who were not classified as established teachers. Thus, transitional teachers included (a) continuing teachers who had changed teaching assignment and/or school since 1997-98, and (b) those who had entered public school teaching during 1998-99 (i.e., too recently to have had sufficient years of service to qualify as established teachers).

Additional teacher supply and qualification variables included in this design (not depicted in Figure 1) are as follows:
Time of entry. First-time teachers with teacher preparation were classified according to the number of years between college graduation and entry into the ranks of employed teachers, as follows.

1. Recent graduates. Recent graduates were entering first-time teachers with teacher preparation who had earned a college or university degree at the bachelor's or graduate levels during the year prior to entry to teaching (i.e., calendar year 1999).

2. Delayed entrants. Delayed entrants were entering first-time teachers with teacher preparation who had not earned a college or university degree at the bachelor's or graduate levels during calendar year 1999, but who had earned a degree during some prior year. As stated above, delayed entrants represent one component of the “Reserve Pool,” a major source of supply of entering teachers. (The other component of the reserve pool is experienced teachers who might elect to reenter teaching.)

Field of degree major. Teachers were also classified according to the academic or professional field(s) in which they had majored, as follows.

1. Degree majors in a field of teacher preparation. Teachers who had completed at least one major in a field of teacher preparation at either the bachelor or master’s degree levels were classified as having a major in teacher preparation. Such teachers were further subdivided in those whose teacher preparation major was in special education vs. those whose teacher preparation major was in general education.

2. Other degree majors. All teachers who were not classified as having majored in a field of teacher preparation were classified as having other degree majors.

Certification status. Teachers were further classified according to their certification status as defined by the type of certification (full vs. part) held in relation to a teacher’s field of teaching assignment, as specified below:

1. Fully certified vs. partly certified in main teaching assignment. Most teachers are fully certified in their main teaching assignment. This means that they have qualified for either an advanced professional certificate, a regular or standard state certificate, or a probationary certificate (i.e., all requirements satisfied except for completion of a probationary period) specifically in the field of their main teaching assignment, viz., in one of 64 specific teaching assignment fields recognized by SASS. All teachers who were not so fully certified were classified as partly certified teachers in their main teaching assignment. Most of these teach-
ers would have qualified for a temporary, provisional, or emergency certificate, though some may have held no certificate at all in their main teaching assignment.

2. **Fully certified vs. partly certified in cognate area of main teaching assignment.** As shown in Appendix A, the 64 specific main teaching assignments were classified into eight cognate areas:
   - General elementary education (including kindergarten).
   - Mathematics and science (including all science fields and computer science)
   - Language (including reading, English/language arts, TESOL, foreign languages, etc.)
   - Social studies/science (including history, philosophy, religion)
   - Arts and physical education (including art, music, dance, drama, and health education)
   - Business/vocational education (including home economics, health occupations, etc.)
   - Other general education (including bilingual, basic skills and remedial, gifted, etc.)
   - Special education (including 15 subspecializations)

A teacher who was *fully certified* in a cognate area was defined as a teacher who qualified for either an advanced professional certificate, a regular or standard state certificate, or a probationary certificate (i.e., all requirements satisfied except for completion of a probationary period) in any main teaching assignment classified within a cognate area. All teachers who were *not* fully certified in their cognate area were classified as *partly certified* in their cognate area.

3. **Fully certified vs. partly certified in any teaching assignment.** All teachers who were fully certified in one (or more) teaching field(s) (regardless of their teaching assignment) were defined simply as *fully certified*. All teachers who were *not* fully certified in any teaching field were classified as *partly certified*.

**Teacher shortage**

Since all teachers should be fully certified in their main teaching assignment, teacher shortage was defined primarily by the number of teachers who were not fully certified in their main teaching assignment. To compare with this definition, teacher shortage was also defined (a) as the number of teachers who were not fully certified in any teaching assignment within their cognate area, and (b) as the number of teachers who were not fully certified in any teaching assignment or cognate area. Technically, teacher shortage should represent the sum of the number of partly certified employed teachers plus the number of open, but unfilled, teaching positions.
However, as demonstrated by SASS, the percentage of unfilled teaching positions in all teaching fields combined has been about 0.2% (Henke, et al., 1997) and such data are unavailable for specific teaching fields. Therefore, the small number of unfilled positions is not included in the quantification of teacher shortage as reported here.

**Analysis Procedures**

Based on the sample of teachers completing the PSTQ, national estimates of the numbers of teachers of each type included in the design (along with associated percentages and standard errors) were computed by special procedures developed by NCES for complex sample survey data (Kaufman & Huang, 1993). The national estimates of teachers, and the sample sizes on which these estimates were based, are shown in the tables of this report.

Because SASS data are subject to design effects due to stratification and clustering of the sample, standard errors for the national estimates and tests of statistical significance were computed by the method of balanced repeated replications (BRR) with a software entitled WesVar Complex Sample Software 3.0. Chi-square tests of the statistical significance of differences among teacher supply and certification variables as a function of teaching field (special vs. general education) were performed on the nationally estimated numbers of teachers.

**Results and Discussion**

To facilitate the presentation of the results of this research on the shortage of fully certified public school teachers nationally, this section is organized in response to six main questions about teacher shortage. Parallel analyses were made for special and general education separately to permit comparisons between these two broad teaching fields.

*To What Extent is the Shortage of Fully-Certified Teachers Chronic and Increasing?*

The long-term trend in the shortage of fully-certified SETs is shown in Figure 2. This figure is based on population data collected annually from state administrative records by OSEP, as provided in its *Annual Reports to Congress* (e.g., OSEP, 2002). These trend data demonstrate the chronic (during the most recent 15-years) and increasing shortage of fully-certified SETs (from 7.4% in 1993-94 to 12.2% in 2001-02). Thus, the shortage percentage of SETs increased by over 50% from 1993-94 to 2000-01. Not only is the shortage percentage serious and increasing, but the number of additional fully-certified SETs needed (i.e., to replace the partly-certified SETs)
Figure 2. National percentage shortage of fully-certified special education teachers by school year. Shortage is defined as the percentage of total special education teaching positions in public schools that are not filled by teachers who are fully certified in their main teaching assignments. This includes special education teachers who are less than fully certified plus vacant teaching positions. Based on data from the Data Analysis System (DANS), Office of Special Education Programs, U.S. Department of Education.

Figure 3. Percentage of partly-certified special education and general education teachers by school year. Data sources: The 1987-88, 1990-91, 1993-94, and 1999-00 Schools and Staffing Surveys, NCES, USDE.
has almost doubled over this 15-year period from 27,000 during the 1987-88 school year to 49,000 during the 2001-02 school year (OSEP, 1990 & 2004).

The trend in the shortage of full-certified SETs shown in Figure 2 is replicated in the SASS national sample-survey data shown in Figure 3. For SETs, both Figures 2 and 3 show an increasing shortage of fully-certified SETs culminating at about the 12% level by the end of the twentieth century. Given the two different sources of data for Figures 2 and 3, there is clear and compelling evidence that the shortage of fully-certified SETs is serious, chronic, and has been increasing steadily during the most recent 10 years for which data are available. This correspondence between findings from two entirely different data bases is evidence of the reliability of both.

In Figure 3, a comparable trend in the shortage of full-certified GETs can be seen as well, though the shortage of GETs has been from 2-4 percent lower than that of SETs.

Is the Shortage Problem Related to Type of Continuing Teachers?

In response to this question, it is important to consider both (a) the numbers of continuing teachers by type and (b) the certification status of each type, as shown in Table 1. The two types of continuing teachers studied were:

- Established teachers (i.e., continuing teachers who had remained in the same main teaching assignment and in the same school for at least two consecutive years, viz., the 1998-99 and 1999-20 school years), and
- Transitional teachers (i.e., continuing teachers who had not remained in the same assignment and school during this two-year period).

The national percentages of partly certified established and transitional continuing teachers are presented in Table 1. The percentage of partly certified teachers was a function of teacher stability (i.e., established vs. transitional teachers), such that considerably higher percentages of transitional teachers were only partly certified than were established teachers. This problem was greater in special education where 23.2% of transitional SETs were partly certified in comparison with 16.6% of transitional GETs ($p<.05$).

A striking finding seen in Table 1 is that relatively low and equivalent percentages of established SETs and GETs were only partly certified (7.4% vs. 7.6%, respectively). This result indi-

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2 The difference between the percentage of partly certified transitional SETs (23.2%) and transitional GETs (16.6%) was statistically significant ($t (1022) = 2.27, p<.05$ two-sided).
Table 1. *Special Education and General Education Teaching Forces in Public Schools: National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Four Supply Sources for the 1999-2000 School Year*

<table>
<thead>
<tr>
<th>Supply Source</th>
<th>Teaching Field</th>
<th>Partly Certified(^a)</th>
<th>Total-Teachers</th>
<th>General Education(^a)</th>
<th>Partly Certified(^b)</th>
<th>Total-Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Special Education</td>
<td>%</td>
<td>SE %</td>
<td>Number</td>
<td>Col %</td>
<td>%</td>
</tr>
<tr>
<td>I. Continuing Teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Established Teachers</td>
<td></td>
<td>7.4%</td>
<td>0.7%</td>
<td>256,489</td>
<td>77.7%</td>
<td>7.6%</td>
</tr>
<tr>
<td>B. Transitional Teachers</td>
<td></td>
<td>23.2%</td>
<td>2.8%</td>
<td>47,890</td>
<td>14.5%</td>
<td>16.6%</td>
</tr>
<tr>
<td>Subtotal: Continuing</td>
<td></td>
<td>9.9%</td>
<td>0.7%</td>
<td>304,379</td>
<td>92.2%</td>
<td>8.7%</td>
</tr>
<tr>
<td>II. Entering Teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. First-Time Teachers</td>
<td></td>
<td>60.2%</td>
<td>5.6%</td>
<td>13,292</td>
<td>4.0%</td>
<td>38.1%</td>
</tr>
<tr>
<td>B. Experienced Teachers</td>
<td></td>
<td>27.7%</td>
<td>3.6%</td>
<td>12,626</td>
<td>3.8%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Subtotal: Entering</td>
<td></td>
<td>44.4%</td>
<td>3.9%</td>
<td>25,917</td>
<td>7.9%</td>
<td>31.2%</td>
</tr>
<tr>
<td>Total Teaching Force(^d)</td>
<td></td>
<td>12.6%</td>
<td>0.8%</td>
<td>330,297</td>
<td>100.1%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

**Note.** Data from the 1999-2000 Schools and Staffing Surveys, National Center for Education Statistics, USDE.

\(^a\)Partly Certified % is the percentage of partly certified teachers out of the total number of nationally estimated teachers for each source of supply. SE % is the standard error of the partly certified percentages. Col. % is the column percentages of the nationally estimated number of teachers.

\(^b\)For special education teachers, the supply source by full- vs part-certification (4 x 2) \(\chi^2\) was 613.4 (\(p < .001\)).

\(^c\)For general education teachers, the supply source by full- vs part-certification (4 x 2) \(\chi^2\) was 2106.8 (\(p < .001\)).

\(^d\)The sample size (N) for total teachers was 4,919 for special education and 39,997 for general education.

cates that, once established in their teaching positions, SETs are as qualified as GETs (in terms of full certification). Accordingly, the most serious shortage of fully certified SETs does not reside principally in the main body of continuing teachers in special education, 77.7% of whom were classified as established teachers. This may be due in part to the assignment of more qualified SETs to the best schools that offer more stable teaching assignments. Teachers generally prefer to stay in such schools, and such schools prefer to retain the more qualified teachers.

By contrast with established SETs, a more serious problem lies in the relatively high numbers of transitional SETs who were only partly certified (23.2%). And as will be taken up in the following section, the most serious problem lies in the high percentage of entering SETs (44.4%) who are only partly certified.
Nonetheless, the shortage of fully certified SETs is a major problem in both categories of continuing teachers. A shortage of 7.4% of fully-certified established SETs (though equivalent to that of established GETs) is not trivial. In terms of numbers of teachers, 19,000 established and 11,000 transitional SETs (out of 304,000 continuing SETs) were not fully certified during the 1999-00 school year.

Accordingly, multiple strategies should be enhanced and intensified to improve substantially the certification status of the teaching force in special education—strategies designed to target differentially established, transitional, and entering SETS. Improvements in the qualifications of continuing teachers occur in several ways. For example, some beginning teachers may satisfy all requirements for full certification shortly after entering the teaching force by completing an examination or a final course requirement, or by submitting necessary paperwork from one state to another. Many other continuing teachers improve their qualifications by earning degrees from teacher preparation programs while employed as teachers (Boe, Cook, Paulsen, Barkanic, & Leow, 1999; Cook & Boe, 2004), while others may complete teacher preparation programs leading to certification but not to degrees. And there are many professional development and alternative route certification programs, some of which are helpful in improving teacher credentials (Rosenberg & Sindelar, 2001). However, the extent to which partly certified teachers attain full certification in their main teaching assignments while employed as teachers is not known. Research on this topic can and should be conducted with NCES's Teacher Followup Survey of 2000-00 which was administered one year following the 1999-00 SASS, the data source used in the research reported here. Nonetheless, the annual improvement in qualifications by employed teachers has been far from sufficient to reduce the chronic shortage of fully certified SETs shown in Table 1.

How Do Entering Teachers Affect the Shortage of Fully Certified Teachers?

It might be expected that the chronic shortage of fully certified SETs would be reduced year-by-year as more qualified teachers were hired into the teaching force. However, as seen in Table 1, the percentage of partly-certified entering SETs (44.4%) in 1999-00 was much higher than the comparable percentage of continuing SETs (9.9%). Thus, entering SETs increased the overall shortage percentage which stood at 12.6% of all SETs in 1999-00.

---

3 For SETs, the difference between the percentage of partly certified entering teachers (44.4%) and the partly certified continuing teachers (9.9%) was statistically significant ($t(700) = 8.71, p<.001$ two-sided).
For general education, the percentage of partly-certified entering GETs (31.2%) was also much higher than the comparable percentage of continuing GETs (8.7%). Thus, the differences between the shortages of fully certified entering SETs (44.4%) and GETs (31.2%) was a matter of degree; that is, the problem of a high percentage of partly-certified entering teachers was not unique to special education. Overall, the shortage of fully certified teachers in special education was not only large in absolute terms (12.6% of all SETs), but somewhat larger than general education (10.5% of all GETs).

Not only was the percentage of partly-certified entering SETs high as shown in Table 1 (44.4% in 1999-00), but it has been increasing during the past decade (31.3% in 1990-91; 34.5% in 1993-94; Boe, Bobbitt, Cook, Barkanic, & Maislin, 1998). Given these facts, it is not surprising that there has been a trend of increasing overall shortage of fully certified teachers in special education as shown in Figures 2 and 3. Positive factors, such as year-to-year improvement in certification credentials made by continuing teachers through continuing professional development, have been insufficient to overcome the negative effects of the extraordinarily high percentage of partly certified entering SETs. This highlights the importance of improving the qualifications of the pool of applicants from which entering teachers are hired.

Is the Shortage Problem Related to the Sources of Supply of Entering Teachers?

The two main sources of entering teacher supply shown in Table 1 (i.e., first-time and experienced) were subdivided into seven particular sources of entering teachers (as described in the Method section), the results of which are presented in the rows of Table 2. From this table, it is apparent that (a) the percentages of partly certified SETs varied greatly by supply source (from 26.8% for reentering experienced SETs, to 98.6% for first-time SETs with nontraditional teacher preparation), and (b) the percentages of partly certified SETs were consistently higher than for GETs across the multiple sources of supply.

As further seen in Table 2, the difference between the partly-certified percentages for SET and GET recent graduates (the subtotal) was substantial (41.0% vs. 27.5%, respectively) and statistically significant ($p<.01$). Likewise, the difference between the partly-certified percentages

---

4 The difference between partly certified entering SETs (44.4%) and entering GETs (31.2%) was statistically significant ($t(1499) = 3.22, p<.01$ two-sided).

5 The difference between partly certified total SETs (12.6%) and total GETs (10.5%) was statistically significant ($t(44,896) = 2.56, p<.02$ two-sided).
<table>
<thead>
<tr>
<th>Supply Source: Entering Teachers</th>
<th>Teaching Field</th>
<th>Special Education&lt;sup&gt;a&lt;/sup&gt;</th>
<th>General Education&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Partly Certified&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Partly Certified&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>SE%</td>
</tr>
<tr>
<td>I. First-Time Teachers: Recent Graduates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. With Traditional Teacher Preparation</td>
<td></td>
<td>35.9%</td>
<td>7.7%</td>
</tr>
<tr>
<td>B. With Non-Traditional Teacher Preparation</td>
<td></td>
<td>98.6%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Subtotal: Recent Graduates&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td>41.0%</td>
<td>7.8%</td>
</tr>
<tr>
<td>II. Reserve Pool</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. With Traditional Teacher Preparation</td>
<td></td>
<td>64.9%</td>
<td>9.3%</td>
</tr>
<tr>
<td>B. With Non-Traditional Teacher Preparation</td>
<td></td>
<td>98.2%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Subtotal: Reserve Pool&lt;sup&gt;e&lt;/sup&gt;</td>
<td></td>
<td>42.7%</td>
<td>4.7%</td>
</tr>
<tr>
<td>III. Other Entering Teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. First-Time Teachers without Preparation</td>
<td></td>
<td>97.8%</td>
<td>1.5%</td>
</tr>
<tr>
<td>B. Private School Migrants</td>
<td></td>
<td>32.9%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Subtotal: Other Entering Teachers</td>
<td></td>
<td>60.2%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Total Entering Teachers&lt;sup&gt;g&lt;/sup&gt;</td>
<td></td>
<td>44.4%</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

Note. Data from the 1999-2000 Schools and Staffing Surveys, National Center for Education Statistics, USDE.

<sup>a</sup>Partly Certified % is the percentage of partly certified teachers out of the total number of nationally estimated teachers for each source of supply. SE % is the standard error of the partly certified percentages. Col. % is the column percentages of the nationally estimated number of teachers.

<sup>b</sup>For special education teachers, the supply source by full- vs part-certification ($7 \times 2$) $\chi^2$ was 111.1 ($p < .001$).

<sup>c</sup>For general education teachers, the supply source by full- vs part-certification ($7 \times 2$) $\chi^2$ was 586.0 ($p < .001$).

<sup>d</sup>For recent graduates, full- vs part-certification by teaching field ($2 \times 2$) $\chi^2$ was 8.5 ($p < .01$).

<sup>e</sup>For the reserve pool, full- vs part-certification by teaching field ($2 \times 2$) $\chi^2$ was 25.6 ($p < .001$).

<sup>f</sup>Sample size (n) is less than 30.

<sup>g</sup>The sample size (N) for total entering teachers was 457 for special education and 3,683 for general education.
for SETs and GETs entering from the reserve pool was substantial (42.7% vs. 28.1%, respectively) and highly significant \( (p<.001; \) see footnote “e” of Table 2). In contrast, the differences between the partly-certified percentages between SETs and GETs for the modest number of other entering teachers (first-time teachers without teacher preparation, and private school migrants) were not statistically significant. Overall, a substantially and significantly higher percentage of entering SETs (44.4%) were partly certified than entering GETs (31.2%) \( (p<.01, \) as reported in footnote “3”). The main reasons for a greater shortage of fully certified entering SETs than entering GETs will be addressed in the following sections.

For special education, almost all first time teachers with non-traditional teacher preparation (either recent graduates or delayed entrants), or with no teacher preparation, were partly certified in their main teaching assignments (i.e., about 98% partly certified). These sources produce over 13% of all entering SETs. The partly certified percentages for entering GETs drawn from these sources are somewhat lower (but still very high, ranging from 70.4% to 91.4%). Given that these particular sources of entering teacher supply produce so few fully certified teachers, it seems puzzling on the surface as to why such sources are used. The predominant reason must be that there is insufficient supply of fully certified teachers from other sources.

The best sources of fully certified SETs and GETs for public schools are recent graduates who have completed traditional teacher preparation programs, reentering experienced teachers, and private school migrants (though even 22 to 36% of entering teachers from these sources are only partly certified). However, first-time SETs with traditional teacher preparation who delayed entry to the teaching force yielded considerably higher percentages of partly certified teachers (64.9% for delayed entrants vs. 35.9% for recently graduated SETs). Thus, it is likely that the more qualified traditionally-prepared teachers were successful in securing teaching employment soon after graduation, while SETs who were less qualified had to wait for opportunities to be hired as teachers.

Consequently, the qualifications of the teaching profession would be improved by hiring recent graduates of teacher preparation programs and experienced teachers over other sources of entering teacher supply (if the supply of qualified applicants were sufficient). Still, the specific effect of hiring recent graduates of teacher preparation programs was actually to increase the quality demand for fully certified replacement teachers rather than to reduce it, as might be hoped. Therefore, the solution to the shortage of fully certified teachers is not found simply in
recruiting sufficient numbers of such teachers out of the entering supply pools available in recent years.

Solutions to the teacher shortage problem will no doubt require a combination of strategies including: (a) the production of a much larger number of qualified first-time teachers available to be recruited as entering teachers (b) upgrading the qualifications of employed teachers, (c) improving the match between teacher assignment and teacher qualifications, and (d) improvement in the retention of qualified SETs who would otherwise leave teaching. In spite of the conclusion by the National Commission on Teaching and America’s Future (2003) that the latter strategy holds the greatest promise of solving the teacher shortage problem, others have produced quantitative evidence and reasons why there is but modest potential for improving the retention of qualified teachers under present working conditions and compensation policies (Boe, Bobbitt, & Cook, 1997).

Is the Shortage Problem Related to the Sources of Supply of First-Time Teachers?

In order to analyze in more detail the reasons why a much smaller percentage of entering first-time teachers in special education are fully certified than in general education, we investigated the particular fields of study in which first-time teachers earned degree majors. As seen in Table 3, this analysis revealed major differences between first-time SETs and GETs, both in terms of their educational backgrounds and the degree to which they were only partly certified.

The predominant differences between first-time SETs and GETs are seen in those who completed traditional teacher preparation programs, the type representing 74.0% of first-time SETs and 82.4% of first-time GETs. For these teachers, the partly certified percentage of SETs (46.9%) was much greater than that of GETs (27.7%) (p<.01, as reported in footnote “d” of Table 3). However, there was no appreciable difference between SETs and GETs in their partly certified percentages when their degree major was in the same field as their teaching assignment (28.5% vs. 24.9%, respectively).

The main source of the high percentages of partly certified SETs (who have completed traditional teacher preparation) was found in the 17.6% of SETs who had degree majors in general education and the 9.9% who had majors in other fields. By contrast, only 0.5% of GETs with traditional teacher preparation had a degree major in special education, while 27.2% had degree majors in other fields (i.e., such as mathematics or English, subject matters relevant to teaching at the secondary level). In short, the certification status of teachers in special education suffer by
Table 3. *First-Time Special and General Education Teachers in Public Schools: National Estimates of the Percentage of Teachers Who Were Partly Certified in Their Main Teaching Assignment by Teacher Preparation and Degree Major for the 1999-2000 School Year*

<table>
<thead>
<tr>
<th>Supply Source: Entering Teachers</th>
<th>Teaching Field</th>
<th>Special Education(^a)</th>
<th>General Education(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Partly Certified(^b)</td>
<td>Total Teachers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>SE%</td>
</tr>
<tr>
<td>I. With Traditional Teacher Preparation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Teacher Preparation Major in Same Teaching Field</td>
<td></td>
<td>28.5%</td>
<td>8.4%</td>
</tr>
<tr>
<td>B. Teacher Preparation Major in Other Teaching Field</td>
<td></td>
<td>73.5%</td>
<td>10.3%</td>
</tr>
<tr>
<td>C. Other Major</td>
<td></td>
<td>85.4%e</td>
<td>11.0%</td>
</tr>
<tr>
<td>Subtotal: With Traditional Teacher Preparation(^d)</td>
<td></td>
<td>46.9%</td>
<td>6.7%</td>
</tr>
<tr>
<td>II. With Non-Traditional Teacher Preparation</td>
<td></td>
<td>98.3%e</td>
<td>1.9%</td>
</tr>
<tr>
<td>III. Without Teacher Preparation</td>
<td></td>
<td>97.8%e</td>
<td>1.5%</td>
</tr>
<tr>
<td>Total First-Time Teachers(^f)</td>
<td></td>
<td>60.2%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Note. Data from the 1999-2000 Schools and Staffing Surveys, National Center for Education Statistics, USDE.

\(^a\)Partly Certified % is the percentage of partly certified teachers out of the total number of nationally estimated teachers for each source of supply. SE % is the standard error of the partly certified percentages. Col. % is the column percentages of the nationally estimated number of teachers.

\(^b\)For special education teachers, the supply source by full- vs part-certification (4 x 2) \(\chi^2\) was 81.5 (\(p < .001\)).

\(^c\)For general education teachers, the supply source by full- vs part-certification (4 x 2) \(\chi^2\) was 428.0 (\(p < .001\)).

\(^d\)For teachers with traditional teacher preparation, full- vs part-certification by teaching field (2 x 2) \(\chi^2\) was 25.4 (\(p < .01\)).

\(^e\)Sample size (n) is less than 30.

\(^f\)The sample size (N) for total entering teachers was 209 for special education and 1,950 for general education.

The hiring of too many out-of-field teachers, less than a quarter of whom earned full certification in special education. The parallel problem in general education was not nearly as serious. The lack of fully certified first-time SETs was exacerbated by the fact that 26.1% of such SETs received non-traditional teacher preparation or no teacher preparation. Of these, practically none were fully certified.
This dismal condition in the hiring of first-time SETs is clearly due to a lack of fully certified candidates available to assume open teaching positions. Certainly, if fully-certified applicants were available to fill open positions, they would be hired. Put plainly, there is a serious shortage in the supply of fully certified first-time SETs. To confront this reality in hiring a teacher for each of its classrooms, special education has had to hire over 50% of its first-time teachers from out-of-field or without traditional teacher preparation. Thus, the shortage of fully certified teachers in special education keeps growing over a period of years due to inadequate supply of fully certified teachers to fill the demand.

To What Extent is the Shortage Problem Due to Misassignment of Fully-Certified Teachers?

It has been thought that improving the match between the fields of teacher certification and assignment (i.e., by reducing out-of-field teaching in this respect) has considerable potential for reducing the shortage of fully certified teachers (Ingersoll, 2002). To examine the degree to which this might be true, we analyzed the extent to which SETs and GETs who were only partly certified in a particular main teaching assignment were fully certified in a different main teaching assignment. The results are shown in Table 4 for the entire teaching forces in special and general education, and in Table 5 for first-time teachers in these fields.

In Table 4 it can be seen that 12.6% of all SETs were partly certified in one of 15 specific main teaching fields to which they were assigned within special education (e.g., developmentally delayed, learning disabilities, visually impaired, etc.). This percentage defines the shortage of fully certified SETs. Of the teachers without such full certification, 0.9% were fully certified in a different specific main teaching assignment within special education (i.e., 11.6% of SETs were not fully certified in any of the 15 main teaching assignments within special education). Thus, there was little “misassignment” of fully certified SETs within special education. That is, only a small component of the shortage of fully certified SETs can be attributed to misassignment of SETs within special education.

Of the 11.6% of all SETs who were not fully certified in one of 15 specializations within special education, it was likely that many were fully certified in a particular teaching assignment within general education. As shown in Table 4, 9.0% of all SETs did not have full certification in any teaching assignment, general or special education. This can be viewed as the remarkably-large hard core of SETs who lack the basic credentials to be employed as a teacher, i.e., a minimal index of teacher shortage.
Table 4. Percentage of Total Special and General Education Teachers Who Were Partly Certified: National Estimates by Three Categories of Teaching Assignments for the 1999-2000 School Year

<table>
<thead>
<tr>
<th>Total Teachers: Certification by Teaching Assignment</th>
<th>Statistic&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Special Education</th>
<th>General Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. In Main Teaching Assignment&lt;sup&gt;b&lt;/sup&gt;</td>
<td>% Partly Certified</td>
<td>12.6%</td>
<td>10.5%</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
<td>0.8%</td>
<td>0.2%</td>
</tr>
<tr>
<td>II. In Any Teaching Assignment within Cognate Area&lt;sup&gt;c&lt;/sup&gt;</td>
<td>% Partly Certified</td>
<td>11.6%</td>
<td>9.9%</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
<td>0.7%</td>
<td>0.2%</td>
</tr>
<tr>
<td>III. In Any Teaching Assignment&lt;sup&gt;d&lt;/sup&gt;</td>
<td>% Partly Certified</td>
<td>9.0%</td>
<td>8.3%</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
<td>0.6%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total Teachers</td>
<td>National Estimate</td>
<td>330,297</td>
<td>2,268,103</td>
</tr>
<tr>
<td></td>
<td>Sample (N)</td>
<td>4,919</td>
<td>39,977</td>
</tr>
</tbody>
</table>

Note. Data from the 1999-2000 Schools and Staffing Surveys, National Center for Education Statistics, USDE.

<sup>a</sup>Nationally weighted percentages of partly certified teachers based on the total number of teachers. Standard Error % is the standard error of the partly certified percentages. National Estimate is the nationally weighted estimate of the total number of public school teachers in the US.

<sup>b</sup>For teachers certified in their main teaching assignment, certification by field (2 x 2) \( \chi^2 \) was 20.9 \( (p < .001) \).

<sup>c</sup>For teachers certified in any teaching assignment within their cognate area, certification by field (2 x 2) \( \chi^2 \) was 13.9 \( (p < .001) \).

<sup>d</sup>For teachers certified in any teaching assignment, certification by field (2 x 2) \( \chi^2 \) was 2.5 \( (ns) \).

In addition, the difference between the 11.6% of SETs who were partly certified in special education and the 9.0% who were partly certified in any teaching assignment (i.e., a difference of 2.6%) is a measure of the percentage of all SETs who were fully certified only in a teaching assignment in general education. These represent potential future cross-over teachers from special to general education assignments, many of whom switch annually (Boe, Bobbitt, Cook, Barkanic, & Maislin, 1998).

As shown in Table 4, the pattern of part certification by the three categories of teaching assignments for GETs was much the same as for SETs (though the partly certified percentages for GETs were slightly lower). That is, 10.5% of GETs were partly certified in their main teaching...
Table 5. Percentage of First-Time Special and General Education Teachers Who Were Partly Certified: National Estimates by Three Categories of Teaching Assignments for the 1999-2000 School Year

<table>
<thead>
<tr>
<th>First-Time Teachers: Certification by Teaching Assignment</th>
<th>Teaching Field</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>I. In Main Teaching Assignment&lt;sup&gt;b&lt;/sup&gt;</td>
<td>% Partly Certified</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
</tr>
<tr>
<td>II. In Any Teaching Assignment within Cognate Area&lt;sup&gt;c&lt;/sup&gt;</td>
<td>% Partly Certified</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
</tr>
<tr>
<td>III. In Any Teaching Assignment&lt;sup&gt;d&lt;/sup&gt;</td>
<td>% Partly Certified</td>
</tr>
<tr>
<td></td>
<td>Standard Error %</td>
</tr>
<tr>
<td>Total Teachers</td>
<td>National Estimate</td>
</tr>
<tr>
<td></td>
<td>Sample (N)</td>
</tr>
</tbody>
</table>

Note. Data from the 1999-2000 Schools and Staffing Surveys, National Center for Education Statistics, USDE.

<sup>a</sup>Nationally weighted percentages of partly certified teachers based on the total number of teachers. Standard Error % is the standard error of the partly certified percentages. National Estimate is the nationally weighted estimate of the total number of first-time public school teachers in the US.

<sup>b</sup>For teachers certified in their main teaching assignment, certification by field (2 x 2) \(\chi^2\) was 41.1 (\(p < .001\)).

<sup>c</sup>For teachers certified in any teaching assignment within their teaching field, certification by field (2 x 2) \(\chi^2\) was 33.7 (\(p < .001\)).

<sup>d</sup>For first-time teachers certified in any teaching assignment, certification by field (2 x 2) \(\chi^2\) was 31.0 (\(p < .001\)).

assignment, while 9.9% were partly certified in some other teaching assignment within their cognate area. This means that the difference (0.6%) represented teachers who were fully certified in a teaching assignment in their cognate area, but not the one that was their main assignment. Similarly, a smaller percentage of GETs were partly certified in any main teaching assignment (8.3%). The difference between this percentage for part certification in any main teaching assignment classified

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<sup>6</sup>As discussed in the Method section for this analysis, all of the 64 specific main teaching assignments from SASS were classified into eight cognate areas (elementary, math/science, language, social science, arts/PE, business/vocational, other general education, and special education). Teachers were classified as fully certified in a cognate area if they qualified for either an advanced professional certificate, a regular or standard state certificate, or a probationary certificate in any main teaching assignment classified.
ing assignment and the 10.5% part certification in a teacher’s main teaching assignment (a difference of 2.2%) represents out-of-field placements in general education insofar as assignment of fully certified teachers is concerned. Thus, it is clear for both special and general education that the supply of fully certified teachers has simply been insufficient to satisfy the demand for teachers, rather than massive misassignment of fully certified teachers to positions for which they did not hold full certification.

Finally, Table 5 presents a similar analysis to that of Table 4, but focused specifically on first-time teachers. Here we see again the high levels of part certification of first-time SETs and GETs (as first seen in Table 1), and the even higher levels of part certification among first-time SETs than GETs (see footnotes “b, c, and d” of Table 5 for tests of statistical significance). The differences between Row I (partly certified in main teaching assignment) and Row III (partly certified in any teaching assignment) for first time SETs and GETs are not great, nor statistically significant. Thus, it is also clear for first-time teachers in both special and general education that the supply of fully certified teachers has simply been insufficient to fill open teaching positions, rather than massive misassignment of fully certified teachers to positions for which they did not hold full certification.

**Conclusion**

This study provides the first national information specifically on the certification status of first-time SETs and GETs as a function of type of teacher preparation program (traditional, non-traditional, or none). This study also provides the most recent national information on trends from 1987-88 through 2001-02 in the certification status of SETs and GETs. Since these results are based on large national-probability samples of public school teachers, they should not be interpreted as directly applicable to the state or local levels unless supported by other data from the relevant level. Given this caveat, the current findings support the following general conclusions about the national teaching force in public schools:

1. The chronic shortage of fully certified SETs has increased from 7.4% in 1993-94 to 12.2% in 2001-02, and ranged from 2-4% greater than the shortage of fully certified GETs during this time. As the teaching force in special education has grown, the number of additional fully-certified SETs needed (i.e., to replace the partly-certified SETs) has almost doubled within a cognate area. All teachers who were not fully certified in their cognate area were classified as partly certified in their cognate area.
over this 15-year period from 27,000 during the 1987-88 school year to 49,000 during the 2001-02 school year.

2. Among continuing teachers in both special and general education, those who became established in the same teaching assignment in the same school for two years or more had relatively low and equivalent levels of part certification (about 7.5% for both SETs and GETs). However, transitional teachers (i.e., those not established for at least two years) had considerably higher levels of part certification (23.2% of transitional SETs and 16.6% of transitional GETs were only partly certified).

3. The shortage of fully certified teachers was exacerbated by entering teachers, 44.4% of whom in special education and 31.2% of whom in general education were only partly certified. Therefore, to satisfy the demand for numbers of entering teachers, special education apparently had to settle for a cohort of new hires into the teaching force that was seriously under certified, and much more so than the cohort of new hires for general education.

4. None of the sources of entering teacher supply yielded a high percentage of SETs with full certification. The best sources were reentering experienced teachers (26.8% of whom were partly certified), private school migrants (32.9% of whom were partly certified), and recent graduates from traditional teacher preparation programs (35.9% of whom were partly certified). Two sources produced virtually no fully certified teachers (first time teachers with nontraditional teacher preparation or with no teacher preparation). Thus, all categories of entering teachers exacerbated the shortage problem instead of providing a partial solution.

5. The reason 46.9% of first-time entering SETs with traditional teacher preparation were only partly certified cannot be attributed mainly to poor preparation by teacher education in special education. Instead, over 25% of such entering SETs had completed teacher preparation with a degree major in a field other than special education (i.e., in general education or some other major). When the part certification level of first-time SETs with teacher preparation in special education is compared with first-time GETs with teacher preparation in general education, the levels of part certification were quite similar (28.5% for SETs; 24.9% for GETs). In comparison with demand, these facts demonstrate a serious deficiency in the numbers of graduates produced by teacher preparation programs in special education.

6. The shortage of SETs who are fully certified in their main teaching assignment (12.5% of all SETs) is not principally due to misassignment of SETs who are fully certified in some other
assignment or to the influx of teachers from general education who are fully certified in some assignment. Instead, our results show that 9.0% of all SETs were not fully certified in any teaching assignment, while 51.9% of all entering first-time SETs were not fully certified in any teaching assignment.

These conclusions demonstrate that the shortage of fully certified teachers in special education has been a chronic and increasing problem, and that this problem is somewhat higher than in general education overall. Moreover, the magnitude of this problem has increased (a) as the production of degree graduates in special education has declined slowly since 1998 (Cook & Boe, 2004), (b) as the production of special education teachers by alternative routes to certification (ARC) has increased (Rosenberg & Sindelar, 2001), and (c) as the number of teaching positions in special education has grown by almost 30% during just a ten-year period from 297,000 positions in 1990-91 (OSEP, 1993) to 383,000 in 2000-01 (OSEP, 2003).

These trends have occurred just as the requirement for teacher qualifications has been raised substantially by the No Child Left Behind Act of 2001 (NCLB). NCLB requires that new teachers in core academic areas be highly qualified beginning with year 2002-03, and that all teachers in core academic areas be highly qualified by 2005-06. This includes most SETs, and full certification is one of the components of a highly qualified teacher as required by NCLB. In this and other respects, the demand for more fully certified teachers is increasing, yet the response from the field of education has clearly been inadequate.

The practical importance of the results reported here is that they demonstrate the chronic and increasing shortage of fully certified teachers in special education, a problem that has been escalated in magnitude and complexity with NCLB. While much of this is well known in special education, these results quantify the magnitude of the problem in subtle detail with the most recent national data. Thus, the results provide a great deal of information about the sources of teacher supply that exacerbate the shortage problem, and suggest solutions. For example, the decline in the production of graduates of traditional teacher preparation programs in special education not only needs to be reversed, but dramatically increased so that uncertified teachers need not be hired instead. Also, an emphasis on recruiting from among private school teachers instead of from non-traditionally prepared teachers will improve the level of certification of new hires.

Although increasing the supply of newly minted teachers with majors in areas of special education is critical to addressing the shortage of fully certified SETs, this should not be the sole
focus nor diminish other constructive actions—especially upgrading the qualifications of employed SETs through professional development, optimizing the assignment of teachers to positions for which they are fully certified, reducing the transfer of fully certified SETs to general education, and reducing the voluntary exit attrition of fully certified SETs. None of this is easy or inexpensive, or surly it would already have been accomplished and the problem solved. But it is somewhat reassuring to recognize that actions taken to improve substantially the working conditions and professional status of SETs can be expected to have a generalized beneficial effect by increasing the number of individuals beginning teacher preparation, improving the recruitment of well prepared teachers into open special education positions, and enhancing the retention of fully certified SETs.

With respect to the shortage of fully certified teachers (and other dimensions of teacher qualifications), further research is needed to assess the teaching qualifications of graduates of alternative routes to certification (ARC) programs, and the extent to which they impact the shortage of fully certified teachers. In this research, we were able to identify graduates of nontraditional programs but not pinpoint the subset of graduates of ARC programs, per se. In light of our findings that virtually none of the entering first time teachers from nontraditional programs were fully certified in their main teaching assignment in special education, more needs to be known about the graduates of ARC programs.

More generally with respect to the production of qualified teachers, national level multivariate research is needed on the extent to which various forms of teacher preparation and professional development programs produce SETs (a) who are qualified in multiple dimensions (e.g., full certification, subject matter knowledge, and satisfy the NCLB standards for a highly qualified teacher), and (b) who are retained as teachers in special education.

Further, much more needs to be known about teacher turnover as a function of teacher qualifications. For example, Boe, Barkanic, and Leow (1999) found that 35% of teachers that move between schools and leave teaching altogether do so involuntarily. Of the 65% that move or leave voluntarily, Boe et al. found that the partly certified, out-of-field, and least qualified teachers (by teacher self reports) were the ones more likely to move and leave than were the more qualified. Boe, Bobbitt, Cook, Barkanic, and Maislin (1998) also found the same results for teachers who switched between eight broad teaching fields (such as special education, elementary education, science education, etc.). Thus, some turnover is constructive when unqualified
teachers vacate a position and when teachers change to positions for which they are more qualified (Boe, et al., 1999). The management task is to create and engineer incentives to improve the retention of teachers who are qualified in the positions they hold, while either upgrading those who are not qualified, or encouraging their turnover.
References


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