Teacher Quality and Students Placed at Risk: Results from the Baccalaureate and Beyond Longitudinal Study 1993–97

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Introduction

The sweeping No Child Left Behind (NCLB) legislation seeks to impact U.S. education on a broad scale through provisions and mandates that target both resources and student outcomes. Among the more controversial elements of the act are those designed to hold districts accountable for raising the scores of all students, including traditionally underachieving populations such as minority, limited-English-proficient (LEP) students, and students of low socioeconomic status.

One NCLB mandate is to provide every student with a "highly qualified teacher." The mandate arises from growing evidence of the relationship between teacher qualifications and student achievement. Research draws a significant association between differences in student achievement and teacher effectiveness in the classroom (Wright, Horn, and Sanders 1997). Three reports—a 1999 study that used data from a fifty-state survey of policies, the 1993–94 Schools and Staffing Surveys (SASS), and the National Assessment of Educational Progress (NAEP)—all expanded upon these findings. These studies found that teacher-quality variables accounted for 67 to 87 percent of total variance in student achievement (Darling-Hammond 1999). Darling-Hammond determined that such teacher-quality characteristics as certification status and degree in a specific teaching field significantly and positively correlate with student outcomes. Furthermore, significant relationships with student achievement were evident even after controlling for student poverty and language background. This research highlights the critical importance of highly qualified teachers.

Literature Review

What constitutes a "highly qualified teacher"? The definition in the NCLB legislation relies on teacher preparation. Typically, research on the subject has focused on the following characteristics of teacher quality: 1) the relationship between teachers' general academic ability and scholastic background and their students' achievement; 2) the impact of teacher-preparation programs on teacher effectiveness; and 3) student-achievement outcomes associated with the certification status of teachers.

Teachers' Academic Preparation

Teachers' subject-area knowledge positively correlates with student academic achievement. Darling-Hammond's recent review (2002) of literature in this area provides compelling evidence. For example, Druva and Anderson (1983) found 1) that the amount of teacher course work in sciences correlated positively with student science achievement and 2) that the positive correlation was greater regarding student achievement in higher-level science courses. Hawk, Coble, and Swanson (1985) came to similar conclusions in a study of middle school mathematics teachers. They found that students with fully certified math teachers made significantly more progress than students whose teachers were not fully certified in the subject. Monk (1994) also found a positive correlation between teachers' academic workloads in math and science and student achievement in these subjects.

More sophisticated statistical analyses also positively correlate teacher and student academic achievement. Darling-Hammond (2000), summarizing studies by Ferguson (1991), Ferguson and Ladd (1996), and Armour-Thomas et al. (1989), observed that multivariate studies using the school or district as the unit of analysis positively correlate teacher and student achievement. Darling-Hammond found an even more prominent correlation when student characteristics are controlled. For example, in New York City schools, teachers' academic characteristics explain nearly 90 percent of the variance in schools' average reading and math achievement.

Extent of Teacher Education, Preparation, or Training

In a 1993 study, Ferguson and Womack found that teachers' workload in education courses correlated with supervisor evaluations of teacher effectiveness. That finding was supported by a review of teacher-preparation research in which researchers identified the clearly positive effects of teacher-preparation experiences on teaching practices and student achievement (Wilson, Floden, and Ferrini-Mundy 2001). In particular, researchers found clinical experiences and internships to be "perhaps the single most powerful element of teacher preparation" (ibid., p. 2). Such findings validate a 1985 study which determined that

formal pre-service programs produced teachers who outperformed those lacking such preparation (Evertson, Hawley, and Zlotnick 1985).

Teacher Certification

A looming national teacher shortage and class-size reductions have forced many districts, primarily in urban areas, to employ "undercertified" teachers (*Dallas Morning News,* August 15, 2003; *Detroit Free Press,* August 17, 2003). Briefly, undercertified teachers 1) lack regular teaching certification (i.e., teach under emergency or provisional teaching certificates); 2) have not participated in traditional university-based teacher-preparation programs; or 3) have not obtained academic majors in the subjects they teach. Research has shown that using undercertified teachers negatively impacts student learning (Darling-Hammond 1999; Fetler 1999; Goe 2002; Hawk, Coble, and Swanson 1985; Navarette 2003). According to researchers Laczko-Kerr and Berliner (2003):

> . . . [T]he advantage of having a certified teacher is worth about two months on a grade-equivalent scale. . . . [T]he loss from having an undercertified teacher is 20 percent of an academic year. In other words, students pay a 20 percent penalty in academic growth for each year of placement with undercertified teachers.
>
> Common sense and empirical data agree: Those who have trained longer and harder to do the complex work of teaching do it better. (p. 38)

There are indications, however, that ensuring teacher quality might disproportionately affect school districts that serve high proportions of children at risk. The *Dallas Morning News* study rated more than 7,000 schools on a scale that combined the percentages of how many teachers were a) certified, b) teaching in their specialty, and c) had at least two years' experience. Not only did the resulting "teacher preparation index" scores correspond to measures of student achievement; researchers also found that schools with substantial poor, minority, or limited-English-proficiency (LEP) student populations were the least likely to have highly qualified, experienced teachers certified in relevant subject matter (Booth and Ramshaw 2003). Research on national teacher quality and distribution patterns has documented similar findings (Ingersoll 2002).

Given the overwhelming evidence linking teacher qualifications and student learning, it is important to inquire into the issue of equity: whether students living in poverty have received an equitable share of qualified new teachers. This article presents findings on the quality of the distribution of new teachers in relation to school poverty levels.

The Data Source

The data for this study were extracted from the Baccalaureate and Beyond Longitudinal Study 1993–97 (B&B:93/97). Researchers designed B&B:93/97 to examine the postbaccalaureate experiences of 1992–93 bachelor's degree recipients. Using a sample of approximately 11,200 men and women who received bachelor's degrees between July 1992 and June 1993, researchers collected data via a) interviews conducted when the students were seniors in college as part of the 1993 National Postsecondary Students Aid Study (NPSAS:93); b) the B&B First Follow-up conducted in 1994 (B&B:93/94); and c) the Second Follow-up in 1997 (B&B:93/97). Transcript data from the students' institutions are also available for most of the cohort through the NPSAS. Among others, the B&B:93/97 study provides data that address issues related to patterns of preparation for, and engagement in, teaching.

The Characteristics of the Sample

The study sample consisted of teachers who reported during the 1997 survey that their last teaching job was in a public school. Some teachers could have entered and then left teaching, and others could have switched between teaching in public and private schools; thus, their responses to the question on "last teaching job sector" constitute the classification criterion for public school teachers in this report. For purposes of the study, the last teaching job could have meant either "the last job" for those who have left teaching or the current job for those still teaching.

The actual sample size was 1,144 and the weighted sample size was 112,118. The data reported in the study were relatively weighted. Through relative weights, researchers were able not only to approximate the population but also to maintain the achieved sample size. Among those in the sample, 73.3 percent were female, 85.5 percent were white (non-Hispanic); about 70 percent were still in the teaching force by 1997; and most of them had held one (62.3 percent) or two (19.3 percent) regular teaching positions.

Findings

Academic Preparation before and during College

College Entrance Examination (Table 1, page 233). Because most subjects took either the ACT or the SAT as their college entrance exam, researchers examined results of both tests and the distribution of teachers with different quartiles of merged SAT-ACT scores. The quartile was based on all graduates in B&B rather than the sample of the current report. The data in Table 1 suggested that in schools with higher poverty levels, more new teachers scored in the lower quartiles of the SAT-ACT; the trend was statistically significant. For example, in schools where more

than 50 percent of the students lived in poverty, 34.0 percent of the new teachers' SAT-ACT scores fell in the first quartile and only 8.0 percent in the fourth quartile. In contrast, in schools where only 0–4 percent of the students lived in poverty, only 8.6 percent of new teachers' SAT-ACT scores fell in the first quartile, but 22.9 percent fell in the fourth quartile.

Taking Remedial Courses in Reading, Writing, and Math during College (Table 2). There was a statistically significant relationship between the academic levels of students living in poverty and those of new teachers who had taken remedial courses in reading, writing, or math. Data in Table 2 indicated that about 11 percent of such teachers worked in schools where 50 percent or more of the students lived in poverty. The corresponding percentages for other kinds of schools were much lower, ranging from 0 to 7.0.

Normalized College GPA Quartiles (Table 3). The data in Table 3 showed no statistically significant relationship between the percentage of students living in poverty and the distribution of new teachers with various normalized college GPA quartiles [$Gamma = -.06$; $p = .15$].

Academic-preparation data demonstrated that schools with higher poverty levels were more likely to employ new teachers who had lower SAT/ACT scores and who had taken remedial classes during college. However, there was no difference in college GPA for teachers in schools with varying levels of poverty. This section used new teachers' academic preparation before and during college as the dependent variable. The next section investigates new teachers' levels of teacher preparation and certification.

Levels of Teacher Preparation and Certification

The Extent of Teacher Preparation (Table 4). Demand due to teacher shortages has led to emergency- or alternative-certification programs, in which schools hire many teachers lacking traditional preparation. Previous studies have found that schools with higher percentages of students at risk tend to employ teachers who are not fully prepared. Data from the current study related to teacher-preparation and -certification levels confirm that finding. According to the definition for the B&B:93/97 data set, "fully prepared to teach" includes completing the following: student teaching, certification, and participation in a teacher-induction program. Such a standard is high, indeed. Schools with higher levels of poor students were more likely to employ new teachers who did not complete all the requirements for teacher preparation; the relationship was statistically significant. About 74 percent of new teachers in schools with 50 percent or more poor students did not complete all requirements for teacher preparation; percentages for other schools ranged from 61.8 to 65.3.

Whether Currently Certified (Table 5). The data suggest a significant relationship between the academic level of poor students and new teachers' certification status; in addition, schools with extremely high poverty rates tended to hire correspondingly more new, uncertified teachers. In schools where 50 percent or more of the students were poor, 16.9 percent of the new teachers were uncertified. The corresponding percentages for schools with lower levels of poor students ranged from 8.5 to 14.6.

Highest Certification (Table 6). The data here indicated a statistically significant relationship between new teachers' highest certification and the poverty level in a given school. The data clearly indicate that in schools with high poverty levels, a high percentage of new teachers had emergency, temporary, or other nonstandard types of certificates. In schools where 50 percent or more students were poor, 9.9 percent of the new teachers had emergency, temporary, or other certificates. In schools where 20–49 percent of the students were poor, 3.0 percent of the new teachers carried such nonstandard certification. The corresponding percentages for schools with lower levels of students living in poverty ranged from 0.0 to 0.9.

The data in this section demonstrate that students in high-poverty schools tended to employ new teachers who were not fully prepared, did not have full certification, and were more likely to have emergency, temporary, and other certificates. Among the highest levels of certification, the differences among schools with varying levels of poor students were particularly substantial.

Discussion

Two major findings emerged. First, generally speaking, schools with high levels of students in poverty tended to have less-qualified new teachers. That finding was particularly true regarding the extent of teacher preparation and teachers' highest certification and, to a lesser degree, the extent of teachers' pre-collegiate academic preparation. There was, however, no statistically significant difference among various kinds of schools in terms of new teachers' college GPA quartiles.

Second, an investigation of new teachers' certification status revealed a statistically significant difference among schools with various levels of students in poverty. However, examining new-teacher preparation and certification levels revealed that new teachers in schools at risk were clearly much less qualified. Holding a certificate itself seems to capture only part of the inequity. The quantity and quality of the certification status are what underscore the disadvantages of schools with high levels of students in poverty.

In summary, the data indicated that overall, schools at risk had less-qualified new teachers. The less-qualified teaching force would further exacer-

bate the inequity already existing in those schools at risk. As a result, the teaching profession and the broader society face a serious equity issue.

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Table 1
Distribution of New Teachers with Various Merged SAT/ACT Quartiles, across Schools with Different Levels of Students in Poverty

Percentage of Students in Poverty	Quartile			
	1st	2nd	3rd	4th
0–4%	8.6	40.0	28.6	22.9
5–19%	28.7	25.5	31.5	14.4
20–49%	27.7	34.1	24.1	14.1
50%+	34.0	28.7	29.3	8.0

Gamma = –.13; p = .008.

Table 2
Distribution of New Teachers Who Did or Did Not Take Remedial Postsecondary Courses in Reading, Writing, and Math, across Schools with Different Levels of Students in Poverty

Percentage of Students in Poverty	Whether Took Remedial Courses	
	Did Not Take	Did Take
0–4%	100.0	0.0
5–19%	95.1	4.9
20–49%	93.0	7.0
50%+	88.8	11.2

$X^2(3) = 10.4$; p = .02; Cramer's V = .12.

Table 3
Distribution of New Teachers with Normalized College GPA Quartiles across Schools with Different Levels of Students in Poverty

Percentage of Students in Poverty	Normalized College GPA Quartile			
	1st	2nd	3rd	4th
0–4%	16.7	28.6	23.8	31.0
5–19%	20.6	27.7	27.3	24.5
20–49%	22.8	21.1	29.8	26.3
50%+	28.9	24.5	22.5	24.0

Gamma = –.06; p = .15.

Table 4
Distribution of New Teachers with Different Levels of Teacher Preparation across Schools with Various Levels of Students in Poverty

Percentage of Students in Poverty	Extent of Teacher Preparation	
	Did All	Did Not Do All
0–4%	38.1	61.9
5–19%	34.7	65.3
20–49%	38.2	61.8
50%+	25.9	74.1

$X^2(3) = 8.5$; p = .04; Cramer's V = .11.

Table 5
Distribution of Currently Certified or Uncertified New Teachers across Schools with Various Levels of Students in Poverty

Percentage of of Students in Poverty	Certification Status	
	Not Certified	Certified
0–4%	14.6	85.4
5–19%	10.4	89.6
20–49%	8.5	91.5
50%+	16.9	83.1

$X^2(3) = 8.8$; p = .03; Cramer's V = .11.

Table 6
Distribution of New Teachers with Various Highest Certification across Schools with Different Levels of Students in Poverty

Percentage of Students in Poverty	Highest Certification			
	Adv.	Reg.	Prob.	Emergency, Temporary & Other
0–4%	15.8	78.9	5.3	0.0
5–19%	6.8	90.2	2.1	0.9
20–49%	9.0	81.3	6.7	3.0
50%+	6.8	78.6	4.7	9.9

$X^2(9) = 36.9$; $p < .001$; Cramer's V = .13.

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