

## About This Series

“What We Know: How Teacher Preparation Affects Student Achievement” is one in a series of statements from AACTE on topics of major interest to the educator preparation profession. Each statement summarizes findings from rigorous research on the stated subject and/or provides examples of exemplary practices that address the issue. “What We Know” statements are created or modified as new research warrants.

## About AACTE

The American Association of Colleges for Teacher Education (AACTE) is a national alliance of educator preparation programs dedicated to the highest quality professional development of teachers and school leaders in order to enhance PK-12 student learning. The 800 institutions holding AACTE membership represent public and private colleges and universities in every state, the District of Columbia, the Virgin Islands, Puerto Rico, and Guam. AACTE's reach and influence fuel its mission of serving learners by providing all school personnel with superior training and continuing education.



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Students' academic achievement and chances for success in life are greatly enhanced by having been taught by well-prepared, certified school teachers. Fully certified teachers are more effective in raising student achievement than inadequately prepared teachers, including those still in training in alternative programs. Numerous rigorous research studies report positive effects on the achievement of students whose teachers were prepared at collegiate-based educator preparation programs and were licensed by their state to teach. Such teachers have been found broadly effective in enhancing student learning—including that of diverse students such as English language learners and students with disabilities—and in narrowing achievement gaps among minority groups.

Studies cited by those who argue that credentials are not necessary do not hold up to rigorous review. Such studies generally compare alternative-route teachers with a group having even less training, or they examine the effectiveness of alternative-route teachers after they have graduated from the program.<sup>1</sup>

The positive effects of preparation and certification have been documented by analyses of national, state, and district data across a variety of content areas and at both elementary and secondary school levels. The following are highlights—including references and hyperlinks—of a sampling of these findings.

## Preparation/Certification in General

In their 2001 U.S. Department of Education-commissioned review of 57 rigorous studies, Wilson, Floden, and Ferrini-Mundy found consistently positive relationships between teacher preparation and teacher effectiveness. Empirical relationships between teacher qualifications and student achievement were found across studies, using different units of analysis and different measures of preparation, and in studies controlling for students' socioeconomic status and prior academic performance.<sup>2</sup>

## Preparation/Certification in a Subject Area

A value-added study in Louisiana in 2008 of more than 1,200 new math, reading, language arts, science, and social studies teachers from 10 school districts found that certified teachers were more effective than uncertified teachers in increasing their students' achievement. Noell, Porter, Patt, and Dahir analyzed the state test scores of students in grades 4-9 and found negative impacts on student performance linked to teachers' lack of training within the field in which they were teaching. The findings were statistically significant (at  $p < 0.001$ ), and particularly large effects were found for math, language arts, and social studies teaching. The researchers concluded that teachers who are certified in the content area they are teaching are more effective than those not certified to teach that content.<sup>3</sup>

In a 2002 review of research on what makes a good teacher—and the difficulties in answering that question—Dan Goldhaber reported evidence suggesting that teachers' knowledge of their subject matter—as measured by degrees, courses, and certification in that area—is associated with high student performance. Specifically, using studies with more detailed measures of teachers' education levels and course work in particular subject areas, he confirmed the positive influence of teachers' academic preparation on student achievement in math and science.<sup>4</sup>

## Preparation of Elementary School Teachers

A well-controlled 2005 study used longitudinal, individual-level data for 132,000 students from Houston to examine 4th and 5th graders' achievement gains on six different reading and mathematics tests over a 6-year period. Researchers Darling-Hammond, Holtzman, Gatlin, and Heilig found that certified teachers consistently produced stronger student achievement gains than did uncertified and alternatively certified teachers, including Teach for America (TFA) recruits. Controlling for teacher experience, degrees, and student characteristics, uncertified TFA recruits were less effective than certified teachers and performed about as well as other uncertified teachers. TFA recruits who stayed in teaching and became certified after 2 or 3 years did about as well as other certified teachers in supporting student achievement gains; however, nearly all had left teaching after 3 years.<sup>5</sup>

A 2006 analysis by the Duke University research team of Clotfelter, Ladd, and Vidgor studied 10 years of rich longitudinal data on teachers and students. Their work revealed that 3rd, 4th, and 5th grade students whose teachers were fully licensed achieved at higher levels on state math and reading tests than other students whose teachers were uncertified. Conversely, teachers with an "other," or provisional or emergency, teacher license were negatively related to students' achievement.<sup>6</sup>

A study of 3,766 New York City beginning teachers addressed the effects of teacher qualifications on student achievement. Researchers Boyd, Langford, Loeb, Rockoff, and Wyckoff found that students of new teachers who graduated from college-based preparation programs achieved signifi-

cantly larger gains in reading/language arts in grades 4-8 and in mathematics in grades 4-5 than did students of beginning teachers prepared through alternative routes such as TFA and the New York Teaching Fellows.<sup>7</sup> Although TFA and Teaching Fellows educators who stayed in teaching became more effective in later years as they gained experience and training, most left teaching much earlier than other teachers. By Year 4, more than 50% of the alternative program entrants and 85% of TFA candidates had left, compared to 37% of college-prepared teachers. In a later study using this same data base, the researchers also found that both certification and experience had large, significant effects on student achievement. *Not being certified* at the time a teacher taught a math course to fourth or fifth graders *reduced* student achievement by about two thirds of the large gain attributable to teachers' 1st year of teaching experience.<sup>8</sup>

A large national study of 4,400 early elementary children from the Early Childhood Longitudinal Study examined achievement gaps and teacher qualifications using value-added methods. Released in 2009, the report found that students who had a certified teacher for most of their early school experience scored significantly higher in reading than students with uncertified or alternatively certified teachers. Students with fully certified teachers for at least 2 of the 3 grade levels studied averaged 1.5 IRT units greater

growth per year. Teacher certification accounted for 8% of the growth in reading achievement and was particularly influential in predicting growth for African American students. Having fully certified teachers narrowed the academic gap between African American students and European American students across the early elementary grades.<sup>9</sup>

A national study of alternative certification by Mathematica found that, compared to matched teachers in their hard-to-staff, high-minority schools, alternatively certified teachers who were still taking course work while teaching produced significantly lower achievement gains for their students. Controlling for experience, alternatively certified teachers did noticeably less well than their counterparts in mathematics across the entire sample, and these differentials were significant in California, with an effect size of -0.13, which represents more than 1 month per year of mathematics achievement.<sup>10</sup> Furthermore, the study's data showed that teachers from the "low course work" alternative routes actually *lowered* their students'

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achievement scores between fall and spring. Those from “high course work” alternative programs did somewhat better, and their traditionally prepared counterparts achieved the largest gains for students—an increase of about 2 NCEs (normal curve equivalent points) over the course of the year in reading and mathematics.<sup>11</sup>

## Preparation of Secondary School Teachers

Published in 2009, a study by Neild, Farley-Ripple, and Byrnes is one of the few research efforts that examine teachers’ impact on learning in the middle grades. It uses a data set from an urban district to estimate the impact of different certifications (and lack of certification) on middle-grades students’ learning gains in mathematics and science. In mathematics, the researchers found that students with elementary- and secondary-certified teachers outscored those with uncertified teachers. Especially strong effects were seen in science, where students with secondary science-certified teachers substantially outscored those with any other kind of teacher.<sup>12</sup>

A 2007 study of ninth and tenth grade teachers was conducted by the Duke University team of Clotfelter, Ladd, and Vigdor, again utilizing 10 years of rich longitudinal data on teachers and students in North Carolina. The results of this high school study revealed that increased student performance on state-required end-of-course tests was significantly and positively related to their teachers’ having completed a pre-service program of preparation—rather than entering through the state’s “lateral route”—and being certified in their subject area. The authors concluded, “We find compelling evidence that teacher credentials, particularly licensure and certification, affect student achievement in systematic ways and that the magnitudes are large enough to be policy relevant.”<sup>13</sup>

In a study of high school mathematics and science, Goldhaber and Brewer found strong influences of teacher certification on student achievement in both subjects, above and beyond the effects of teachers’ subject matter degrees. They reported that having a teacher with a standard certification in mathematics resulted in an increase in achievement on the 12th grade mathematics test equivalent to about 10%

of a standard deviation, a little more than the impact of having a teacher with a bachelor’s and a master’s degree in mathematics.<sup>14</sup>

Using data on more than 2,800 secondary students from the Longitudinal Study of American Youth, Monk found that education courses in subject matter methods had a positive effect on student learning at each grade level in both mathematics and science. In mathematics, these methods courses had more powerful effects than additional preparation in the content area. Monk concluded that “a good grasp of one’s subject area is a necessary but not a sufficient condition for effective teaching.”<sup>15</sup>

## Preparation of Special Education Teachers

In a 2010 analysis of data from the Florida K-20 Education Data Warehouse, researchers Feng and Sass examined the impacts of preservice preparation on teachers’ ability to promote academic achievement among students with disabilities. Using “value-added” estimates of student achievement over 5 years, the researchers found that students with disabilities in general education classes whose teachers were certified in special education did better in math and reading compared to similar students whose teachers were not so certified.

Further, preservice preparation in special education was found to have statistically significant and quantitatively substantial effects on the ability of teachers of special education classes to promote gains in achievement for students with disabilities, particularly in reading.

Certification in special education, an undergraduate major in special education, and the amount of special education course work in college were all positively correlated with the performance of teachers in special education reading courses.<sup>16</sup>

In a study of beginning special education teachers, those who had completed a state-approved teacher education program demonstrated stronger classroom instructional and management practices than those who were not yet certified. All teachers were rated by observers blind to their preparation status and trained in the use of the Charlotte Danielson observation system, which has been linked to student achievement in urban schools.<sup>17</sup>

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## Preparation of Teachers of English Language Learners

A 2011 study in four Texas school districts compared the achievement of students whose teachers were prepared through TFA with that of students of traditionally prepared teachers of mathematics and English language arts/reading. Students at both elementary (grades 3-8) and secondary (grades 9-11) levels were included in the study. Researchers Ware, LaTurner, Okulicz-Kozaryn, Garland, and Klopfenstein found that lower gains in ELA/reading were evident for elementary and high school Hispanic students of TFA teachers. They encouraged TFA staff to “review their teacher training and support systems to ensure an additional focus on teaching strategies to support Hispanic students.”<sup>18</sup>

A study of elementary-age students in Houston (noted above) also found that the negative effects on student achievement of uncertified TFA teachers were most pronounced for limited English proficient students who took the district tests in Spanish.<sup>19</sup>

## Endnotes

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