Value added student achievement in traditional and alternative teacher preparation pathways.

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VALUE ADDED STUDENT ACHIEVEMENT IN ALTERNATIVE AND TRADITIONAL TEACHER PREPARATION PATHWAYS

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ABSTRACT

The influence of traditional and alternative teacher preparation programs on student achievement was studied in one Tennessee school district. The value added outcomes of students who were assigned to alternatively certified teachers were compared to the outcomes of students who were assigned to traditionally certified teachers. Results showed that alternatively certified teachers performed as well as traditionally certified teachers at all grade levels and content, except in secondary math, where traditionally trained teachers evidenced higher student growth and in secondary social studies, where alternatively trained teachers evidenced higher student growth.

Introduction

A crisis in the pool of potential teachers is clearly on the academic radar. According to Peterson and Nadler (2009) the National Council of Mathematics projects a shortfall of 280,000 qualified math and science teachers by 2015. They stated: "In California, one third of the entire teacher workforce, about 100,000 teachers, will retire over the next decade and need to be replaced." (Peterson & Nadler, 2009, p. 70). Young (2003) observed that more than thirty percent of teachers in the U.S. are over fifty years of age. Furthermore, The No Child Left Behind Act (NCLB) of 2001 mandated "highly qualified" teachers in every core subject classroom. This mandate has added additional pressure for qualified teachers in a shrinking pool of certified candidates. To address the proposed shortfalls of teachers, growing numbers of governmental agencies support alternative teaching licensure routes. According to the National Center for Education Information (2008) all states and the District of Columbia now have some type of alternative teacher licensure program. Peterson and Nadler (2009) indicated that one fifth of all new teachers are certified through alternative routes.

Teacher Licensure: A Contentious Debate

Are licensure requirements necessary to restrict the teaching ranks and ensure teacher quality or are they unnecessary barriers to teaching? This is the central question of the teacher licensure debate. The literature on teacher licensure is conflicting, and the advocates of both traditional and alternative licensures are polarizing in their analysis of each other's work. At present, the opposing teacher education pathways of traditional versus alternative routes do not peacefully coexist. The debate between proponents of both
alternative and traditional licensure represents the highly politicized nature of American public education. Regulation versus market approaches to teacher licensure; the debate on the nature of teacher quality; the value of pedagogy versus content matter; each of these conflicts is played out in a "take no prisoners" approach. Both sides of the arguments are polarizing. Teacher licensure is a high stakes debate, one that is framed for one side to win and the other to lose.

The goals, values, and ideologies of each viewpoint in relation to the research they produce on teacher licensure should be recognized (Cochran-Smith & Fries, 2001). To better appreciate the conflicting perspectives of both camps of teacher licensure, it is helpful to analyze the competing agendas of both alternative and traditional teacher licensure proponents.

The anti-regulation or market approach to teacher licensure posits that the answer to the looming teacher shortage lies in greater reliance on the market through alternative pathways (Hess, 2001; Fraser, 2001; Constantine, et al 2009). Ballou and Podgursky (2000) argued against licensure as a barrier to teaching. Reunzel (2002) suggested that even alternative licensure has become "bureaucratic and unnecessarily restrictive" and that alternate licensure paths are "torturous routes" into teaching (p.14). Regulation, itself, as a means of professionalizing teaching is devalued. Fraser (2001) suggested allowing the school districts to hire whom they wish, with licensure de-coupled from teacher education. Stoddart and Flooden (1995) took issue with the notion of characterizing alternatively licensed teachers as underprepared teachers. They contended that:

The choice between a traditional and an alternate route is not a choice between some professional preparation and no such preparation. It is, instead, a decision about the timing and institutional context for teacher preparation and about the mix of professional knowledge and skills to be acquired. (p.7)

The market approach values de-regulation of teacher licensure so that more people may enter the teaching field without the barriers of licensure. Further, the anti-regulation perspective does not value traditional teacher licensure as a route to teacher quality. These advocates of alternative licensure contend that content knowledge is of most importance to the quality of teaching; one learns to teach by doing it; and mature individuals with prior work experience enrich the teaching corps. They suggest that pedagogy curricula are not necessary to master the actual practice of teaching.

In opposition, the advocates of regulation (Darling-Hammond, Wise, & Klein, 1999; National Commission on Teaching and America’s Future (1996, 1997) dispute the value of market approaches. This regulation or professionalism viewpoint encourages raising entry standards to promote higher status for teachers (Darling-Hammond, et al., 1999; Darling-Hammond & Youngs, 2002). The National Commission on Teacher and America’s Future (NCTAF, 1997) touts pedagogical knowledge as paramount to the teaching profession. The regulation/professionalism approach values licensure through university programs of study to increase pedagogical knowledge and to limit teaching to those candidates proven worthy of the professional status of teaching. These proponents of traditional licensure for teachers through regulation or professionalism suggest that quality teachers require both content and pedagogical knowledge (Darling-Hammond & Scan, 1996; NCTAF, 1996). They maintain that candidates should be trained through accredited teacher education programs of study within universities.

Teacher Licensure and Student Achievement

Teachers may be the single most important factor in student achievement (Rivkin, Hanushek & Kain, 2005; Sanders & Rivers, 1996). One of the ways to hold both traditional and alternative licensure programs accountable is to judge the programs by the effects they have on student achievement. Research on the impact of teacher licensure type on student achievement is similarly conflicting among the licensure camps. Goldhaber and Brewer (2000) found that there was no statistically significant difference in the achievement of students of teachers who hold
standard versus emergency licenses. The methodology of that study was challenged by Darling-Hammond, Berry, and Thorenson (2001) who contended that alternative licensure pathways vary significantly and that the training in these programs are also variable, suggesting the data set of teachers in the study was not representative of teachers in general, and that drawing generalizations for educational policy was invalid.

A study exploring Teach for America teachers conducted by Raymond, Fletcher, and Luque (2001) suggested that there were few differences in student achievement between non-Teach for America teachers and Teach for America teachers in the Houston area. In contrast, Laczko-Kerr and Berliner (2002) maintained that the students of Arizona teachers certified through traditional programs outperformed “undercertified” teachers (including teachers holding emergency, temporary, Teach for America, or provisional certificates) by twenty percent.

Gimbert, Bol and Wallace (2007) found that secondary math teachers trained in alternative licensure routes performed better than math teachers trained through traditional routes. Most recently, in a study commissioned by the U.S. Department of Education, Mathematica Policy Research found no statistically significant difference in the achievement of the students of teachers certified through alternative and traditional routes (Constantine, et al., 2009). Darling-Hammond (2009) countered that the Mathematica study methodology was flawed in that the data set of traditionally certified teachers had less than normal amounts of training (including mentoring, student teaching, and professional development). As a result, the study held no significance for teacher education. The teacher licensure debate rages on.

**Teacher Effects:**

**One Measure of Teacher Quality**

Although it is not the only measure of teacher quality, the effect teachers have on their students’ achievement is recognized as a useful measure in Tennessee. Tennessee is a leader in the Value Added Movement (Sanders & Rivers, 1996). The value-added growth model defines effective teachers as those who impact student achievement. Working with Dr. William Sanders from the University of Tennessee, the state of Tennessee uses a complex statistical model to measure student achievement growth (Tennessee Value Added Assessment System, UT-TVAAS). Tennessee tests students in grades three through eight in reading/language arts, mathematics, science, and social studies. In the upper grades, the state of Tennessee assesses students with end-of-course assessments, including Algebra I, Mathematics Foundations II, English I and II, Biology I, and U.S. History.

Students are measured as they progress through the grades, allowing for the cumulative effects of teachers on student achievement. Tennessee transforms all state assessment scores to a normal curve equivalent scale (NCE). Average student achievement growth over a one year period is calculated. Changes above or below expected growth reflect the impact of an individual teacher on student achievement growth, or the value added measure. One of the ways to judge teacher education pathways is by the effect they have on student achievement. This study used teacher effect measures to compare the student achievement of teachers with traditional and alternative licenses.

**Methodology of the Study**

**Study Site**

The researchers studied the effect that traditionally trained and alternatively trained teachers had on student achievement, as determined by standardized tests from one school district in middle Tennessee. Data were collected from one school district, located in Middle Tennessee. The area served by the subject school district has a population of 147,000 people. It is the seventh largest school district in Tennessee. The student make-up is: 62.7% white; 27.3% African American; 7% Hispanic; 2% Asian; and .5% Native American and Pacific Islander. The district serves 30,000 students with 3,900 teachers, administrators, and staff; has 34 schools; and is the second largest employer in the county.
**Study Design**

This study used an ex post facto design, with analysis of archival data provided by district personnel authorized to view individual teacher and student information. The data collected included the teacher licensure type of participants and the standardized test result means of the teachers’ students. The school district provided anonymous achievement data from 169 teachers. The researchers reduced the data numbers for two reasons. Teachers who had more than one year of experience were excluded. In addition, teachers identified as out of state were excluded from the sample in that there was no indication of prior teaching experience for those teachers. The final data set included all first year traditionally prepared teachers (apprentice license) and alternatively prepared teachers (alternative license). The final number for these analyses included 120 first year teachers, 37 elementary and 83 secondary. Comparisons were made for all content areas at the elementary level and at the content assigned area at the secondary level.

The research question was: Is there a difference in student achievement growth based on teacher licensure preparation pathway? More specifically, do students perform better in first year traditionally prepared teacher classrooms or in first year alternatively prepared teacher classrooms?

**Data Collection**

The district provided the researchers with anonymous data from 169 teachers that were reduced in number to 120 first year teachers. Data were organized into several variables. Variables included teacher assignment, grade level, licensure type, university of last degree and type, and content area achievement scores (including math, science, social studies, and reading/language arts). Tennessee Comprehensive Assessment Program (TCAP) scores were analyzed. The researchers analyzed achievement tests at the fourth through eighth grade levels and Gateway tests for grades nine through twelve for a one year interval. The Normal Curve Equivalent (NCE) was used to determine student achievement growth.

The NCE scores are a type of normalized standard score resulting from the division of the normal curve into 99 equal units. This score is traditionally used for research purposes, enabling researchers to interpret differences in NCEs more readily because of the equal-interval nature of the NCE score. (Laczko-Keri & Berliner, 2002, p. 20)

The study district defines student growth based on the difference between the means from one year to the next. Baseline NCEs were gathered from the 2006-2007 school year and compared to NCE results in the 2007-2008 school year to determine growth for the one year the students received instruction from first year traditionally and alternatively trained teachers. NCE means for each teacher were analyzed to measure the impact of instruction. A score between negative and positive one is expected as average growth for students in the subject school district. A measure of over positive one is considered above average growth for a student. A score of below negative one would suggest low growth or a non-thriving environment for the student. Student achievement data were gathered by content (math, reading/language arts, social studies, and science). For secondary teachers, only one content area score was gathered, determined by area assignment.

**Data Analysis**

First, descriptive statistics were reviewed for skewness and kurtosis. Second, unpaired t tests, with an F test for each, were conducted at the .05 level of significance. The F test was analyzed to determine if the possibility of equal variances existed in the comparison groups. The outcomes of students who were assigned to an alternatively certified teacher were compared to the outcomes of students who were assigned to a traditionally certified teacher. Statview, developed by SAS Institute, Inc., was the statistical software used for all analyses.

Unpaired t tests were conducted to determine the impact of teacher training on student achievement as evidenced by growth in NCE scores. While the numbers are very different for elementary apprentice and alternative teachers, exa-
nation of kurtosis and skewness indicates each could be a fairly normal distribution and the F test indicates the variances for each group could be equal. The value of F exceeds the alpha in each analysis, indicating the possibility of equal variances.

Limitations of the study are that the study size is small and that results are typical for the district of the study only. In addition, no demographic data were gathered for this initial study. The socio-economic status of the schools where teachers were assigned in the 2007-2008 school year is unknown as is the gender of the first year teachers.

Results

There are three results to this study. Table 1, based on the NCE growth, shows a statistically significant difference in performance between students of alternatively certified teachers and those of traditionally certified teachers at the secondary level in math. At the secondary level, the traditionally prepared teachers on an apprentice license evidenced significantly higher growth (M=.985, SD=5.287) in math than did the teachers on alternative licenses (M=-5.466, SD=8.715), t (21) = -2.121, p=.0460.

Table 2, based on NCE growth, shows a statistically significant difference in performance between students of alternatively certified teachers and those of traditionally certified teachers at the secondary level in social studies. At the secondary level, the teachers on an alternative license evidenced significantly higher growth (M=2.579, SD=1.902) in social studies than did the traditionally prepared teachers on apprentice licenses (M=-.317, SD=2.239), t (17) = 2.863, p=.0108.

Table 3, based on the NCE growth, shows no statistically significant difference in performance between students of alternatively certified teachers and those of traditionally certified teachers in all other content areas or grade levels. In math at the elementary level; in science at the elementary and secondary levels (see Table 3); in social studies at secondary level; and in language arts at

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>UNPAIRED T-TEST FOR GROWTH MATH</th>
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<tbody>
<tr>
<td>N</td>
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<td>------</td>
<td>-----</td>
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<td>Total</td>
<td>Alternate</td>
</tr>
<tr>
<td></td>
<td>Apprentice</td>
</tr>
<tr>
<td>Elementary</td>
<td>Alternative</td>
</tr>
<tr>
<td></td>
<td>Apprentice</td>
</tr>
<tr>
<td>Secondary</td>
<td>Alternative</td>
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<tr>
<td></td>
<td>Apprentice</td>
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*p=.05

<table>
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<tr>
<th>TABLE 2</th>
<th>UNPAIRED T-TEST FOR GROWTH SOCIAL STUDIES</th>
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<tr>
<td>Total</td>
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<tr>
<td>Elementary</td>
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</tr>
<tr>
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<td>Apprentice</td>
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<td>Secondary</td>
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</tr>
<tr>
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<td>Apprentice</td>
</tr>
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</table>

*p=.05
both levels (see Table 4), there was no statistically significant difference in performance between the students of alternatively and traditionally certified teachers.

The data below indicate that there is no significant difference in student NCE growth for science either at the elementary level or the secondary level regardless of the preparation pathway and licensure of the first year teacher. Results indicate that students of both types of certified teachers performed in relatively the same manner on the achievement test and Gateway test.

Results of the unpaired t tests for growth in science indicate no statistical difference in performance on the achievement test at the elementary level between students in traditionally prepared teacher classrooms and students in alternatively prepared teacher classrooms. The results at the secondary level on the Gateway test indicate a difference approaching statistical difference but were not found to be significant, as indicated in Table 4.

**Conclusion**

The number of alternatively licensed teachers is growing in the United States. Proponents of alternatively and traditionally licensed teacher pathways have posited conflicting viewpoints of the values inherent in each pathway and research into student achievement as a measure of teacher quality in each licensure pathway has found conflicting results.

This study utilized teacher effect measures to compare the student achievement of first year teachers with traditional and alternative licenses in one school district in Tennessee.

Student achievement data is not the only measure of teacher quality but is one significant factor when judging the quality of all first year teachers.

### Table 3

**Unpaired t test for Growth Science**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
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<th>SD</th>
<th>df</th>
<th>t</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alternate</td>
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<td>-1.324</td>
<td>4.920</td>
<td>48</td>
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<td>.9541</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Alternative</td>
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<td>0.068</td>
<td>4.645</td>
<td>13</td>
<td>.035</td>
<td>.9726</td>
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<td>Apprentice</td>
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<td>-0.055</td>
<td>6.018</td>
<td>13</td>
<td>.035</td>
<td>.9726</td>
</tr>
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<td></td>
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<tr>
<td>Alternative</td>
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<td>4.982</td>
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<td>.9726</td>
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<td>-3.157</td>
<td>5.192</td>
<td>13</td>
<td>.035</td>
<td>.9726</td>
</tr>
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*p = .05

### Table 4

**Unpaired t tests for Growth Reading/Language Arts**

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<tr>
<th></th>
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<th>M</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate</td>
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<td>3.383</td>
<td>60</td>
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<td>3.666</td>
<td>24</td>
<td>-1.968</td>
<td>.0587</td>
</tr>
<tr>
<td>Elementary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative</td>
<td>10</td>
<td>0.230</td>
<td>2.836</td>
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<td>-5.04</td>
<td>.6154</td>
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<tr>
<td>Apprentice</td>
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<td>0.882</td>
<td>3.655</td>
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<td>-5.04</td>
<td>.6154</td>
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<tr>
<td>Secondary</td>
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<td></td>
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</tr>
<tr>
<td>Alternative</td>
<td>10</td>
<td>-1.968</td>
<td>3.666</td>
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<tr>
<td>Apprentice</td>
<td>16</td>
<td>1.033</td>
<td>3.801</td>
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*p = .05
teachers. Tennessee uses NCEs to measure student achievement as students progress through the grades, allowing for the cumulative effects of teachers on students. Teacher effect scores are used to measure a teacher's impact on student achievement. In this study, NCE scores were analyzed to determine the effect that both traditionally and alternatively licensed first year teachers had on the achievement of their students.

The results of this study indicate that statistically significant differences between the alternatively licensed teachers and traditionally licensed teachers do exist in terms of student achievement in one Tennessee school district. The first result of the study is that a statistically significant difference occurred at the secondary level in mathematics. The students of the traditionally licensed teachers scored significantly higher than did the students of the alternatively licensed teachers. Secondly, at the secondary level the teachers on an alternative license evidenced significantly higher growth in social studies than did the traditionally prepared teachers on apprentice licenses. There was no statistically significant difference in the student achievement in all other content and grade levels.

The researchers concede that additional studies should utilize a larger and broader data pool, perhaps from a state-wide initiative. The student achievement data of teacher participants from several districts may provide a more generalizable analysis for policy on the nature of the student achievement in traditionally and alternatively licensed teachers. In addition, gathering demographic data on the teacher participants of the study, both traditional and alternative, may provide insight into the achievement performances of varied groups of teachers.

A growing number of teachers are licensed through alternative pathways into teaching. Evaluating teacher licensure programs based upon the student performance of teachers is one accountability tool and judging teacher preparation programs by the effects they have on student achievement provides this type of accountability. This study analyzed student achievement measures to compare teacher preparation pathways. Continued research using this measure of teacher quality may yield better understanding of both traditional and alternative licensure pathways into teaching in an era of looming teacher shortages.

References


Acknowledgements

The authors would like to thank the following colleagues for their guidance and helpful comments:

Dr. Roger Wiemers,
Tennessee State University;

Dr. David Denton,
Austin Peay State University;

Dr. Charles Grah,
Austin Peay State University