

Exploring the Uniformity of South Carolina Teacher Vacancies: Policy and Practice Implications for Addressing the Teacher Shortage in South Carolina

WORKING PAPER SERIES II:
What We Know About the South Carolina Teacher Workforce

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+ INTRODUCTION

Throughout the United States, school districts suffer from severe and growing declines in the teacher supply pipeline. Through a combination of growing student enrollments, reduced student-teacher ratios, teacher attrition, and waning interest in entering the teaching profession, the projected demand for new hires far outpaces estimated supply. Although both state and national policy have focused on efforts to recruit more teachers, national data suggests that efforts to retain pre-retirement departures are of even greater importance. The roughly 8% annual attrition rates account for 85-95% of all teacher demand (Sutcher et al., 2016). Reducing the U.S. annual attrition rate in half, closer to that of other countries, would nearly eliminate teacher shortages and allow for more selective hiring.

While often reported in aggregated totals, the teacher shortage is non-uniform. Teacher attrition rates are higher in rural areas (8.4%) than in urban and suburban areas (7.9% and 7.4%, respectively) (Latterman & Steffes, 2017), leading to shortages in areas that generally have lower teacher salaries, thus more difficulty in competing for new hires. Teacher attrition rates are also higher in special education, science, and mathematics (Sutcher et al., 2016), leading to increased vacancies in subject areas where alternative wage opportunities are higher.

While high attrition rates account for the vast majority of vacancies across the U.S., fewer high school students are expressing an interest in the teaching profession. In a 2017 survey of ACT completers, just 5% of test takers indicated an interest in the teaching profession (Croft, Guffy, & Vitale, 2018). The combination of non-uniform, high rates of attrition and declining interest in the teaching profession has resulted in a growing crisis, highlighted both by national data, as well as the annual Supply and Demand Report in South Carolina conducted by CERRA. Each year, CERRA collects vacancy data through a survey of district personnel, including full-time equivalent vacancies by subject area. Those data are gathered at the district level and organized by geographic region (e.g., Lowcountry, Upstate, etc.).

The annual Supply and Demand reports have consistently demonstrated declining enrollment in teacher preparation and increasing vacancies statewide. The report continues to be a valuable asset to policymakers in South Carolina. Given SC TEACHER's unique role as South Carolina's Center for Research on Teacher Education, exploring issues of policy and practice along the teacher pipeline continuum at the state's flagship research campus, SC TEACHER sought to extend the analyses of these data. We combined data from CERRA with existing data sets to explore the uniformity of South Carolina's teacher shortage in relation to national trends, as well as to observe the relationship between student achievement and vacancies throughout South Carolina. This report represents the first look at South Carolina's teacher shortage in relation to geography, poverty, subject area, and achievement – all key markers in determining policy and practice decisions at the state and district levels.

+ DATA SOURCES

Through partnership with CERRA, SC TEACHER obtained the reported data on the number of teacher vacancies and the number of full-time equivalent (FTE) teaching positions for SC school districts overall and by subject area at the start of the 2020-21 school year. The CERRA data included subject area vacancies and regions of the state where districts are located. Additional district demographic information were obtained from the ERate data on student eligibility for free or reduced-price meals from the SCDE's website (<https://ed.sc.gov/districts-schools/nutrition/meal-programs/national-school-lunch-program/e-rate-free-and-reduced-meal-eligibility-data/>). This file includes urban/rural classification, percentage of students designated as pupils in poverty (PIP), and number of students enrolled for SC schools and school districts. The most current data available at the time of this report was the 2019-20 school year.

District-level student achievement results from SC School Report Card data were obtained from the SCDE's website (<https://screportcards.ed.sc.gov/>). The 2018-19 school year was the most recent year with available student assessment data as assessments were not administered in 2019-20 due to the COVID-19 pandemic. The district-level assessment results include two assessment programs in two subject areas that are used for state and federal accountability reporting. The elementary/middle school results use the SC READY assessment for English/language arts (ELA) and mathematics, and the high school results use the End of Course assessments for English 1 and Algebra 1 courses. The SC READY assessments are administered to students in grades 3-8. The End of Course assessments are administered to students when they complete the associated courses.

+ DATA ANALYSIS

A total of 80 school districts were included in the analysis. Two school districts that serve incarcerated youth and young adults were excluded from the analysis. An additional district was excluded because of missing survey data. For each subject area, the percentage of vacant positions was computed among all vacant positions in the state (total of 683.9) and the percentage of FTE positions was computed among all FTE positions in the state (total of 55,571.96). Further, descriptive statistics were computed for the percentage of vacant positions relative to the number of FTE teaching positions in the district by subject area and by various demographics.

In South Carolina, the highest vacancies are in special education, early childhood education/elementary, and mathematics.

Demographics considered include factors known to contribute to the teacher shortage, urban/rural classification from the ERate data, and region of the state from the CERRA data. Quartiles for district percentage of PIP were computed, and the districts were divided into four poverty levels according to these quartiles. District size was initially categorized according to National Center for Education Statistics (NCES) classifications based on number of students enrolled and ranging from 1-299 students to 25,000+ students. After examining the distribution of SC school districts by size, the NCES categories were collapsed for an overall classification of large (24 districts with 10,000+ students), medium (33 districts with 2,500-9,999 students), and small (23 districts with fewer than 2,500 students) districts.

To examine the relationship between teacher vacancy rates and student achievement, a correlation analysis was conducted between district-level achievement measures and teacher vacancy rate. The achievement measures include the percentage of students who met or exceeded standards on the SC READY ELA and mathematics assessments and the percentage of students who earned a score of A, B, or C on the End of Course English 1 and Algebra 1 assessments. Spearman's rho correlation based on ranks was used to measure the monotonic association between each achievement measure and teacher vacancy rate. Spearman's rho was selected because it is not sensitive to skewed data or outliers.

+ RESULTS

Table 1, Table 2, and Figure 1 present information on vacant teaching positions in SC at the start of the 2020-21 school year by subject area across all school districts. Table 3 and Figure 2 present information on the distribution of teacher vacancy rates overall and by key district demographics. Table 4, Figure 3, and Figure 4 display results from the correlation analysis examining the relationship between teacher vacancy rate and student achievement.

Overall

Considering all vacancies in the state from Table 1, the subject areas with the largest percentages include special education (17.6% of all vacancies), early childhood education/elementary (13.6% of all vacancies), and mathematics (11.1% of all vacancies). These subject areas collectively represent about half of all teaching positions in the state with approximately a third of all FTE positions in early childhood education/elementary. Examining data from Table 2 and Figure 1, subject area vacancy rates ranged from 0% to 3.7% with a median of 1.5%. The subject areas with the highest vacancy rates include speech language (3.7%), art (2.9%), and world languages (2.6%). Additional subject areas with vacancy rates greater than 2% include psychologist, librarian, special education, and literacy.

Statewide, 1.2% of all teaching positions were vacant at the start of the 2020-21 school year. The overall distribution of vacancy rates for school districts was right skewed with two districts that had relatively high vacancy rates. Thus, when examining descriptive statistics, the median provides a more representative measure of central tendency than the mean. District vacancy rates ranged from a low of 0% (for 17 districts) to a high of 19.2% with a median of 0.9%. Fifty percent of all SC school districts had teacher vacancy rates between 0.2% (Q1) and 2.6% (Q3).

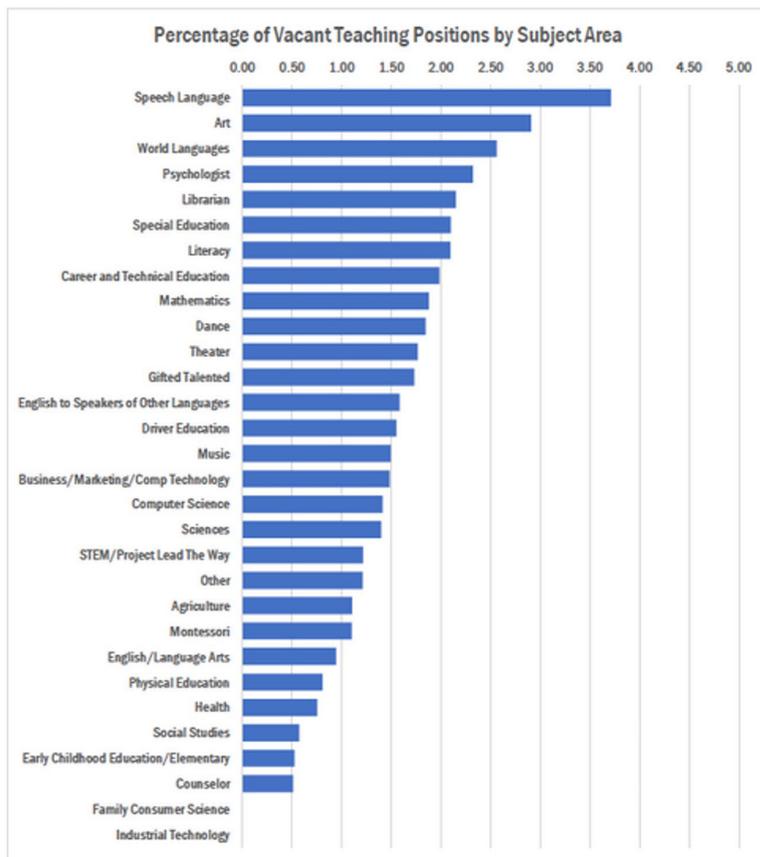
Table 1
Vacant and Total FTE Teaching Positions in 2020-21 for SC School Districts by Subject Area

Subject Area	% of All Vacant Positions in SC	% of All FTE Positions in SC
Special Education	17.62	10.33
Early Childhood Education/Elementary	13.60	31.91
Mathematics	11.11	7.29
Sciences	6.95	6.11
Art	5.63	2.38
English/Language Arts	5.41	7.07
Speech Language	4.74	1.57
World Languages	4.46	2.15
Music	3.58	2.96
Librarian	3.58	2.05
Career and Technical Education	3.22	1.99
Literacy	3.14	1.85
Social Studies	2.85	6.16
Physical Education	2.41	3.67
Business/Marketing/Computer Technology	2.19	1.82
English to Speakers of Other Languages	1.97	1.54
Psychologist	1.90	1.01
Counselor	1.68	4.09
Gifted Talented	1.10	0.78
Montessori	0.58	0.66
STEM/Project Lead The Way	0.51	0.52
Theater	0.44	0.31
Dance	0.37	0.24
Agriculture	0.22	0.24
Health	0.22	0.36
Other	0.22	0.22
Computer Science	0.15	0.13
Driver Education	0.15	0.12
Family Consumer Science	0.00	0.38
Industrial Technology	0.00	0.09

Table 2
 Vacant Teaching Positions in 2020-21 for SC School Districts Considering FTE Positions for Each Subject Area

Subject Area	Total Vacant Positions	Total FTE Positions	% of Vacant Positions
Speech Language	32.40	872.73	3.71
Art	38.50	1323.6	2.91
World Languages	30.50	1193.06	2.56
Psychologist	13.00	560.65	2.32
Librarian	24.50	1139.75	2.15
Special Education	120.50	5741.95	2.10
Literacy	21.50	1026.14	2.10
Career and Technical Education	22.00	1108.49	1.98
Mathematics	76.00	4048.43	1.88
Dance	2.50	135.65	1.84
Theater	3.00	169.75	1.77
Gifted Talented	7.50	433.97	1.73
English to Speakers of Other Languages	13.50	854.15	1.58
Driver Education	1.00	64.5	1.55
Music	24.50	1643.03	1.49
Business/Marketing/Comp Technology	15.00	1010.9	1.48
Computer Science	1.00	71	1.41
Sciences	47.50	3395.06	1.40
STEM/Project Lead The Way	3.50	289.06	1.21
Other	1.50	124.1	1.21
Agriculture	1.50	136	1.10
Montessori	4.00	364	1.10
English/Language Arts	37.00	3931.1666	0.94
Physical Education	16.50	2041.51	0.81
Health	1.50	199.65	0.75
Social Studies	19.50	3425.575	0.57
Early Childhood Education/Elementary	93.00	17,732.84	0.52
Counselor	11.50	2272.5	0.51
Family Consumer Science	0.00	212.75	0.00
Industrial Technology	0.00	50	0.00
TOTAL	683.90	55,571.96	1.23

Figure 1. Percentage of Vacant FTE Teaching Positions by Subject Area in 2020-21 for SC School Districts



Key Demographics

Considering district data by key demographics, factors associated with more variation in teacher vacancy rates for districts include rural location, high concentration of PIP, and relatively small size. These factors often comingled with smaller districts and districts with the most PIP also located in rural areas of the state. Districts in the highest poverty quartile for percentage of PIP had a median teacher vacancy rate of 3.6%, which is the highest median among all demographic subgroups considered.

Examining regions of the state, districts in the Upstate had the lowest median teacher vacancy rate of 0.1% with the least variation among all regions. The Savannah River and the Midlands regions had similar median teacher vacancy rates of about 0.9% with districts in the Savannah River region having considerably more variability in vacancy rates than those in the Midlands. The highest median and variation among teacher vacancy rates was for districts in the Lowcountry (median of 2.1%) and Pee Dee (median of 2.5%) regions of the state. Each of these regions included districts with one of the two largest vacancy rates in the state (19.2% for one Lowcountry district and 16.5% for one Pee Dee district). Both regions include coastal areas of SC. Two charter school districts included schools across the state (Statewide as region), one with a teacher vacancy rate of 0.6% and the other of 3.0%.

Table 3
Percentage of Vacant Teaching Positions in 2020-21 for SC School Districts Overall and by Key Demographics

	Subgroup	N	Min	Q1	Median	Q3	Max	Mean	Std Dev
Overall	N/A	80	0.00	0.18	0.90	2.59	19.23	1.92	3.15
Geographic Context	Rural	54	0.00	0.00	0.96	3.06	19.23	2.32	3.71
	Urban	25	0.00	0.44	0.75	1.03	3.80	1.01	1.03
Poverty Quartiles	Q1 (% PIP ≤ .6156)	20	0.00	0.30	0.65	1.22	2.98	0.89	0.80
	Q2 (.6156 < % PIP ≤ .7096)	20	0.00	0.00	0.43	0.89	1.15	0.47	0.42
	Q3 (.7096 < % PIP ≤ .7847)	20	0.00	0.00	0.71	1.28	3.80	1.05	1.24
	Q4 (% PIP > .7847)	20	0.00	2.59	3.57	6.23	19.23	5.26	4.82
School Size (# of students)	Large (10,000+)	24	0.00	0.58	0.89	1.43	3.80	1.21	1.03
	Medium (2,500-9,999)	33	0.00	0.15	0.89	2.78	6.10	1.49	1.68
	Small (<2,500)	23	0.00	0.00	0.92	4.35	19.23	3.27	5.27
SC Region	Upstate	17	0.00	0.00	0.13	0.47	1.42	0.34	0.43
	Savannah River	18	0.00	0.41	0.92	3.12	7.94	1.75	2.07
	Midlands	17	0.00	0.59	0.95	1.37	3.80	1.10	0.93
	Statewide	2	0.59	0.59	1.78	2.98	2.98	1.78	1.69
	Lowcountry	9	0.56	1.03	2.13	5.51	19.23	4.41	5.94
	Pee Dee	17	0.00	0.00	2.48	3.73	16.48	3.18	4.14

Figure 2

Box and Whisker Plots of Teaching Vacancy Rates for SC School Districts in 2020-21 by Key Demographics



Note. Statewide districts were not included in the region plot due to small sample size.

Relationship with Student Achievement

From Figures 3 and 4, a curvilinear pattern is evident for the relationship between teacher vacancy rate and each achievement measure/subject area. Districts with higher teacher vacancy rates tend to have lower student achievement results for both SC READY and End of Course assessments. The values of Spearman’s rho in Table 4 quantify these associations. The correlations range from $-.45$ to $-.55$, which are in the moderate range. Correlations are slightly higher for End of Course assessments at the high school level than for the SC READY assessments at the elementary/middle school level. All correlations differ from zero with statistical significance at the .05 level.

Figure 3. Scatter Plots and Histograms from the Correlation Analysis of District Teacher Vacancy Rate and Student Achievement on SC READY Assessments in ELA and Mathematics

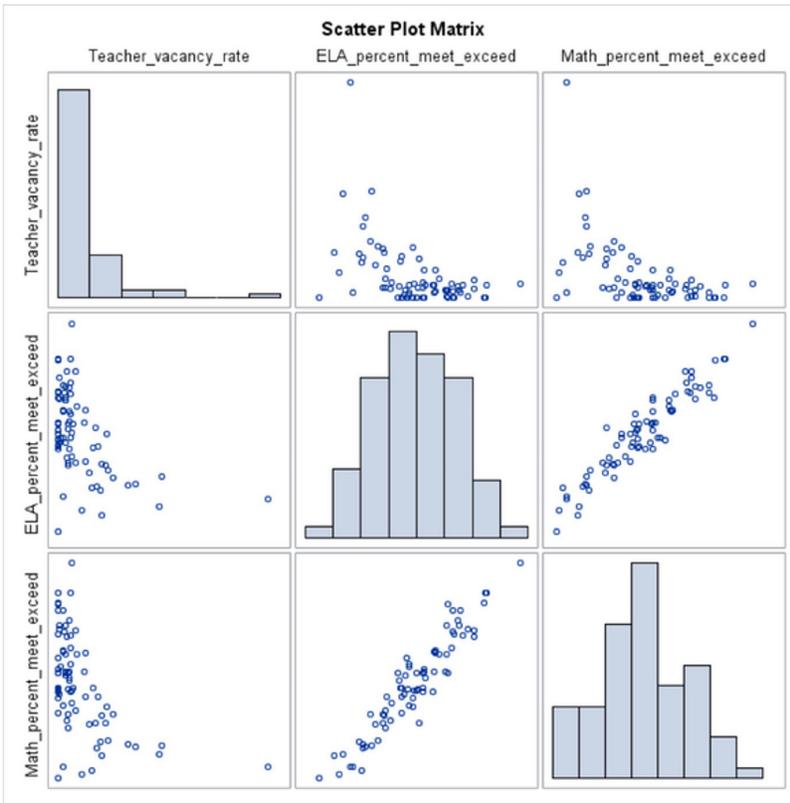


Figure 4. Scatter Plots and Histograms from the Correlation Analysis of District Teacher Vacancy Rate and Student Achievement on End of Course Assessments for English 1 and Algebra 1

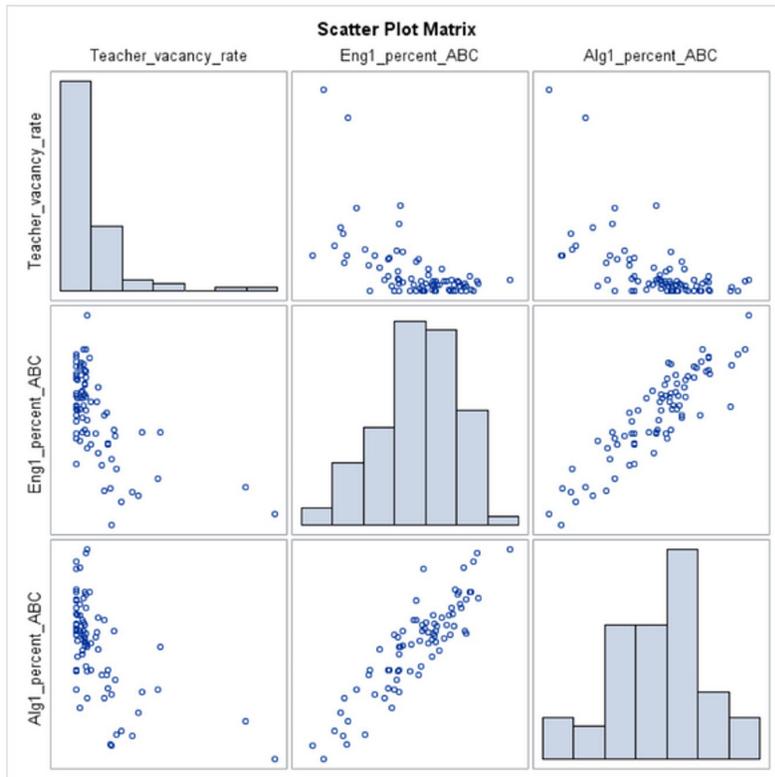


Table 4

Spearman's Rho Correlation (p-value) between District Teacher Vacancy Rate in 2020-21 and Student Achievement Measures from 2018-19 by School Level and Subject

Assessment	Subject	
	ELA/English 1	Math/Algebra 1
SC READY (grades 3-8)	-.449 (< .0001)	-.499 (< .0001)
End of Course (high school)	-.535 (< .0001)	-.546 (< .0001)

+ DISCUSSION AND RECOMMENDATIONS

South Carolina teacher vacancies by subject area generally mirror the rest of the United States, with a few differences in the highest subject areas. Specifically, the highest vacancies nationally are in special education, mathematics, and science. In South Carolina, the highest vacancies are in special education, early childhood education/elementary, and mathematics. Nationwide, the U.S. Bureau of Labor Statistics (2020) reported 443,700 special education teachers in 2019 among a total of 3.3 million public school teachers, representing 13.4% of the teacher workforce. In South Carolina, Special Education teachers represent 10.33% of the teacher workforce, yet 17.6% of all vacancies reside in special education— a significant over representation. Conversely, the high percentage of vacancies in early childhood education/elementary (13.6%) is a reflection of the higher total early childhood education/elementary FTEs (31.91% of all teaching positions).

Teacher vacancies in South Carolina are consistent with national data indicating greater teacher shortages in rural areas. There were also significant differences in vacancies across South Carolina regions, lowest in the Upstate, and highest in the Lowcountry and Pee Dee regions. Previously, we have shown that teacher retention was not significantly different in rural schools in South Carolina (Fan et al., 2020). As such, the vacancies in rural districts can be considered to be persistent issues of teacher recruitment exacerbated by issues of widespread issues of retention.

Generally, higher poverty districts struggle to attract and retain teachers. Analyzed at the district level, vacancy rates among the three lowest quartiles of poverty were fairly uniform, with much higher vacancy rates among the highest poverty districts. As such, the infusion of resources to address teacher shortages among higher poverty districts should specifically target those within the highest poverty quartile. It should also be noted that poverty is not uniform within districts; thus, analyzing district level data might mask school and community differences within districts. Future data collection and analyses should, ideally, include school level data so within-district differences can be explored.

The teacher induction period, defined as years one through three in the classroom, represents a crucial time of development for teachers. Research on new teacher effectiveness has indicated that the student achievement scores of beginning teachers fall below mean values during their first years of instruction before rising in years three through five (Henry et al., 2013). As such, retaining early career teachers not only eliminates turnover and the costs associated with replacing teachers but also results in higher student achievement. It is unsurprising then that there is a significant correlation between vacancy rate and student achievement in South Carolina. Closing achievement gaps necessitates a strong, stable teacher workforce aided by policies and practices that stabilize shortcomings in key areas identified here and elsewhere.

South Carolina's ability to attract and retain a strong teacher workforce is predicated on a number of interrelated factors and policy decisions. Almost universally, teacher shortages exist due to high rates of early departures. Given the non-uniformity of South Carolina's teacher shortage, both in certification area and geographic region, resources currently allocated to teacher recruitment and retention should specifically target areas in which the teacher shortage is most acute. Strong, research-based teacher induction experiences, differentiated salary schedules, and targeted recruitment efforts are among the strategies known to address vacancies and should be leveraged among the most hard-to-staff contexts. Hiring bonuses, while attractive, do little to help retain teachers; however, differentiated pay schedules for the highest poverty quartile districts, as well as special education, science, and mathematics fields, provides sustained increased compensation shown to keep teachers in their current assignments. Using data from the South Carolina Department of Education, Fan et al. (2020) demonstrates a variety of school-level factors that impact teacher retention. Further exploration of these factors in relation to recruitment and retention resources is necessary to fully address the variety of impacts on teacher retention, and thus teacher vacancies in South Carolina.

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