

The Pennsylvania State University

The Graduate School

College of Education

**PENNSYLVANIA TEACHER SHORTAGE AREAS: SUPPLY, DEMAND, AND
RETAINMENT**

A Thesis in
Educational Theory and Policy

by

Tabatha M. Goodale

© 2019 Tabatha M. Goodale

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Arts

May 2019

The thesis of Tabatha Goodale was reviewed and approved* by the following:

Maryellen Schaub
Associate Professor of Education (Educational Theory & Policy)
Professor-in-Charge, Education and Public Policy
Thesis Advisor

Kai Schafft
Associate Professor of Education (Educational Leadership) and Rural Sociology

Kevin Kinser
Professor of Education
Head of the Department of Education Policy Studies

*Signatures are on file in the Graduate School

ABSTRACT

This thesis investigates the school level factors, including both school and organizational characteristics that contribute to district teacher shortages in Pennsylvania. Using the Nationwide Teacher Shortage Area Listing for the 2017–2018 school year, five school districts are identified as persistently having a teacher shortage. School and organizational level characteristics of these districts that consistently appeared on the list over the past decade are described and then compared to state averages. These descriptors, including student to teacher ratio, teacher salary, and standardized test scores, were then used to predict an additional three districts that recently identified a shortage that may continue to have a teacher shortage and suggest steps to address these shortage areas.

TABLE OF CONTENTS

LIST OF FIGURES	v
LIST OF TABLES.....	vi
Chapter 1 The U.S. “Teacher Shortage”	1
Demand	3
Supply	4
Retention	6
Chapter 2 Pennsylvania’s Persistent Teacher Shortage Areas	8
<u>Organizational Level Characteristics</u>	14
<u>School Level Characteristics</u>	16
Chapter 3 School Level Conditions as Indicators	20
Chapter 4 Implications of the Revolving Door of Teachers	25
<u>Student Outcomes</u>	26
<u>Cost of Attrition</u>	27
<u>Policy suggestions</u>	28
References.....	31

LIST OF FIGURES

Figure 2-1: Number of Pennsylvania Teacher Shortage Area Districts.....9

LIST OF TABLES

Table 2-1: Organizational Level Characteristics of Districts with a persistent shortage...	14
Table 2-2: School Level Characteristics of Districts with a persistent shortage.....	16
Table 2-3: Percent of students proficient or advanced on the Reading Standardized Tests. .	17
Table 2-4: Percent of students proficient or advanced on the Math Standardized Tests.	17
Table 3-1: School Level Characteristics of Districts at risk of a persistent shortage.....	22
Table 3-2: Organizational Level Characteristics of Districts at risk of a persistent shortage.	22

Chapter 1

The U.S. “Teacher Shortage”

A severe teacher shortage has been a pending threat from education researchers for decades now. Starting in the early 1980s, education policy researchers have warned of a looming shortage in elementary and secondary teachers (Darling-Hammond, 1984). Citing many of the same concern’s researchers have today, Darling-Hammond expressed a concern for a coming demographic shift making waves in the supply and demand of teachers in the U.S. Increasing student enrollment and a “graying” teacher population raised concerns about how these positions would be filled. Darling-Hammond also referenced how new opportunities were beginning to open for the woman, that at one point were limited to teaching. She explains that the salary and working conditions of teaching do not make it as attractive as other careers. Over three decades later, concern over the attractiveness of teaching is still a topic of conversation.

In response, policies began to pop up around the country, geared toward getting more teachers into classrooms. Alternative certification programs began to streamline new teachers into classrooms and financial incentives were implemented to recruit more of the “best and brightest” to fill the anticipated vacancies in underperforming schools. The “graying” of the teaching force led to the “greening” of the teaching force when there was a mass influx of new teachers at the end of the 20th century. Before this period, the average teacher had 15 years of experience, but by 2004 the average teacher was in their first year (Ingersoll 2012). A “green” teacher had become the new norm.

These demographic predictions were not misguided. Since 1984, k-12 student enrollment and the teacher workforce has consistently increased and during the 1999/2000 school year, 58% of schools reported difficulty filling open positions. Though, at the same time, less than half of the schools' recruiting in any specific subject had trouble (Ingersoll 2003). Suggesting that the shortage effects some schools more than others. Declining interest in a teaching career has also been noted in the steady decline in enrollment in teacher preparation programs since 2008/09.

Data from the ACT and the Department of Education show that fewer high school students are interested in pursuing a career in education and fewer college students are enrolling in teacher preparation programs. From 2010 to 2014, the number of high school students who showed interest in a general education major on their ACT dropped by about 5,000. This lack of interest also appears in enrollment in teacher preparation programs. From 2008/09 to 2013/14, the Department of Education showed that enrollment in teacher preparation programs fell by 35% (Aragon 2016).

More recently, research has shifted from the demographic explanation for the shortage, to a more robust description, including many factors of supply, demand, retention and their effects. Articles describing the shortage as "A case of Wrong diagnosis and Wrong Prescription" (Ingersoll 2002) or having a previously "missing element" (Cowan et al. 2016) have brought attention to the many aspects of the teacher staffing problem in the U.S., including turnover, changes in the education field and the attractiveness of teaching as a profession. This new framework shined a light on the fact that "looking at the teacher shortage as a simple question of supply and demand oversimplifies the many factors

involved in the issue” (Sutcher et al. 2016), most importantly those that influence teacher attrition and retention.

Demand

A recent report from the Learning Policy Institute (Sutcher et al. 2016) identified the three major influences on the current demand for teachers in the U.S. as student enrollment, student-teacher ratio, and attrition. Changes in student enrollment directly influence the demand for teachers because an increase in the school-aged population requires an increase in teacher workforce to meet the increasing need. The report notes that public school enrollment grew 26% from 1986 to 2007, remained stable from 2007 to 2015 and predicts an increase in student enrollment starting in 2016, reaching 53 million by 2025.

The student-teacher ratio is also related to student enrollment and the teacher work-force but is influenced by policy. Depending on the economic conditions and the desired class size of the school, student-teacher ratios can fluctuate. In 1986 the average class size was 18 – 1 until a push for smaller classes and increased staffing for special education in the late 1990s. By the 2008/09 school year, the average student-teacher ratio in the U.S. was 15.3-1 until the Great Recession hit, decreasing school budgets and raising student-teacher ratios to 16-1 in 2010. The report estimates that it would take an additional 145,000 teachers to bring the student-teacher ratio back to pre-Great Recession levels.

The last piece of demand the report outlines is the number of teachers that leave the profession or attrition. The most obvious form of departure from teaching is retirement but it only accounts for about a third of teacher attrition. The other two-thirds are described as preretirement attrition. This is when a teacher leaves their position due to staffing decisions, life change or dissatisfaction with the teaching. This kind of attrition was estimated to account for 66% of the 2015/16 new hire demand. In 1989, the attrition rate was around 6% but by 2004 it climbed to and stayed hovering around 8%. That two percent difference may seem small, but it was estimated that the 2% difference increased the 2015/16 school year demand by 25%. All factors of demand are constantly in flux. Year to year, one may have more influence than the other, but the Learning Policy Institute report showed that in both 2011/12 and 2015/16 preretirement attrition was the largest driver of demand.

Supply

When thinking about the teacher shortage issue, the most logical way to conceptualize the supply of teachers is the number of individuals that hold a valid teaching credential that are not currently in the workforce. This pool of individuals is divided into two groups, new entrants and re-entrants, who left the field for a period and are returning. New entrants make up about half of the annual teacher supply pool (Sutcher et al. 2016), but as the number of entrants in teacher preparation programs continues to decline, the supply of new entrants is an increasing concern.

As the 20th century ended, there was a great concern around the supply of teachers in the United States. A combination of increasing student enrollment and the anticipation of many teachers retiring was believed to create a shortage of U.S. teachers (Serpell & Bozeman 1999). With a growing demand for teachers, recruitment efforts were initiated across the country but when the Great Recession hit, school budgets were slashed, teachers were laid off and those who were expected to retire waited due to the economic crisis.

Research has shown that college students exposed to this kind of high unemployment rates during their schooling tend to pick majors that earn higher salaries and have better employment prospects (Aragon 2016), partially explaining the decline in enrollments in teacher education. This trend was highlighted by the U.S. Department of Education, Office of Postsecondary Education when it showed a decrease of almost 50% from 2009 to 2014 in teacher preparation programs. In addition, high school students' interest in pursuing an education degree dropped from 15% in 2010 to 12% in 2014 (Aragon 2016).

The other portion of the supply pool is re-entrants. The proportion of the pool this population takes up is influenced by the local labor markets and economic conditions but in the years around the Great Recession, they were estimated to make up 37-49% of the teacher supply pool. Most teachers who choose to re-enter will do so within a year or two and the longer a teacher stays out of the classroom, the less likely they are to return (Sutcher et al. 2016).

When you take a closer look at the teacher supply pool, scholars have identified a disconnect between the supply of teachers and the demand for specific subject areas.

Research shows that teacher preparation programs are overproducing teachers in low-demand areas such as elementary education (Sawchuk 2013) and under-producing in fields like math and science. In addition, the supply is not evenly distributed and some schools, even in the same metropolitan area, have wait lists of teachers while others are struggling to find someone qualified to fill their positions (Ingersoll 2003).

Retention

Teaching accounts for a significant portion of the U.S. workforce, representing 4% of the entire civilian workforce. Given its size, a consistent flow of teachers in and out of the field is expected. A limited degree of turnover is not a bad thing, new entrants bring new blood that can facilitate innovation and reduce stagnancy in a field. But too much suggests the organization has underlying problems (Ingersoll & Smith 2003).

The literature around teacher retention shows a wide range of factors that contribute to a teacher's decision to stay in or leave their current position. Gail D. Hughes divided these factors into four categories in her 2012 study on teacher retention in the South. Specifically, she stated that these factors can be teacher characteristics (years of teaching experience, gender, educational level, ethnicity, grade level, and subject or content area), school characteristics (size, socioeconomic status, standardized test scores, and student ethnicity), organizational characteristics (salary, workload, facilities, resources, parent and student cooperation, and principal support) and teacher efficacy (instructional, student moderation, classroom management, and technology). Personal characteristics such as

pregnancy and other family obligations have also been noted but have been generally seen as an uncontrollable factor.

Organizational Characteristics such as salary, workload, and recourses play a critical part in teacher retention. For instance, a teacher whose workload is increasing while their salary is not can become more dissatisfied with their salary (Hughes 2012). Class size is one factor that can increase a teacher's workload and fuel a teacher's desire to leave (Brill & McCartney 2008) but, standardization, students with disabilities and other special needs also contribute to the workload of a teacher.

Teacher shortages are a major concern for policymakers and school or district leaders, but the severity of the shortages differs by the “particular dynamics of state – and local – teacher labor markets with some regions and states experiencing more severe shortages than others.” (Castro et al. 2018). Currently, the country's insufficient supply of teachers qualified in high need subjects and disadvantaged school districts inability to retain available teachers suggests increasing future teacher shortages for certain school districts.

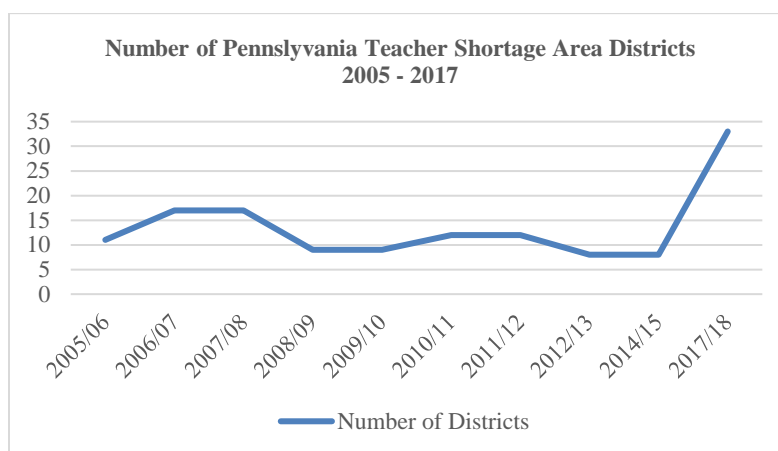
Chapter 2

Pennsylvania's Persistent Teacher Shortage Areas

In June of 2017, the U.S. Department of Education Office of Postsecondary Education released the Teacher Shortage Areas Nationwide Listing for 1990-1991 through 2017-2018. The annual report lists the nation's teacher shortage areas by state and is used to carry out provisions of federal student financial aid programs, 34 CFR 682.210(q), 34 CFR 674.53© and 34 CFR 686.12. The report uses the 34 CFR 682.210(q)(8)(vii), definition of "teacher shortage area", meaning "an area of specific grade, subject matter or discipline classification, or a geographic area in which the Secretary determines that there is an inadequate supply of elementary or secondary school teacher." The methodology prescribed in 34 CFR 682.210(q) (6) (iii) is what the State Chief State School Officer (CSSO) office of each state is encouraged to use to determine its state's proposed teacher shortage areas.

A state that wishes to identify teacher shortage areas for recognition under these programs must submit the required information for this report identified by the programs. For the Department to consider the State specified areas as teacher shortage areas the percentage of the State's proposed teacher shortage areas may not exceed five percent of all unduplicated full-time equivalent elementary and secondary teaching positions in the state (Teacher Shortage Area Listing 2017-18).

Figure 2-1: Number of Pennsylvania Teacher Shortage Area Districts, Adapted from the Teacher Shortage Nationwide Listing 1990-91 through 2017-18.



Given these requirements, some states simply reported the subjects in need, others, such as Pennsylvania, listing the individual districts that need teachers. This allowed Pennsylvania's data to be analyzed longitudinally at the district level. Using this data, longitudinal trends were analyzed to identify the severity of the teacher shortages and which districts are most affected.

Figure 2-1 shows the number of districts with teacher shortages from 2005 to 2018 in Pennsylvania. The graph shows that over the 10-year period from 2005/06 to 2014/15, the number of districts reporting a teacher shortage is relatively stable. Then, from 2014/15 to 2017/18, there is a dramatic 4-fold increase in the number of school districts in Pennsylvania reporting a teacher shortage. Every year Pennsylvania identified at least 8 districts as having a teacher shortage but in 2017 the shortage reached its greatest number thus far at 33 districts. Additionally, in the ten most recent years available of the survey, most school districts appeared on the teacher shortage list only

once, with an average appearance of 2.5. However, some districts were listed as having a shortage all ten years.

This sharp increase and reoccurring districts suggest that there was something happening in these Pennsylvania school districts that could be related to their inability to attract and retain teachers to their school. To understand this, I analyzed the school's districts that are reappearing on the teacher shortage list year after year. The districts included were those identified of having a persistent shortage, defined as those who had reported a teacher shortage in at least eight of the past ten years of the listing. This included Erie City, Harrisburg City, and Lancaster, Philadelphia City, and Reading school districts.

Erie City School District is an urban school district in Erie County serving Erie, the fourth largest city in Pennsylvania with an estimated population of 98,593 across about 19 square miles of land (Erie City School District). Erie County has a median household income of \$48,192 (QuickFacts). The first school in Erie dates to 1860 and the district is now home to 15 public schools and about 11,000 k-12 students (Common Core of Data). Erie City is also the only one of the five districts that are not located in Southeastern Pennsylvania. 57% of the families with school-aged children in Erie City live in two-parent households, 67% of those families have both parents in the labor force. 37% of these families are families with a single mother, 77% of which are employed. Just over half of Erie City School District residents (52%) own their own home and just under half (48%) are renters (Kids Count).

Harrisburg City is an urban school district located in southern Pennsylvania. Serving Harrisburg proper, the Capital city of Pennsylvania and seat of Dauphin County,

Harrisburg City is a school district comprised of 12 schools and about 7,000 k-12 students, making it the smallest of the five persistent school districts. Harrisburg is also the regional center for finance transportation, commerce, history, and government (Harrisburg City School District). The counties average household income is \$57,071 (QuickFacts) and 35% of the families with school-aged children in Harrisburg City live in two-parent households. 55% of those families have both parents in the labor force. 56% of these families are families with a single mother, 74% of which are employed. In 2010 39% of homes in the district were owner-occupied (Kids Count).

Lancaster School District is an urban school district that serves about 11,000 Lancaster County k-12 students. There are 39 different languages spoken in the district and the district's 19 schools serve over 400 refugee students (School District of Lancaster). The average household income in Lancaster County is \$61,492 (QuickFacts). Lancaster city covers about 13 square miles and is home to 213,274 people (School District of Lancaster). Half of the families with school-aged children in Lancaster live in two-parent households, 66% of those families having both parents in the labor force. 41% of these families are families with a single mother, 75% of which are employed. In 2010 47% of homes in the district were owner-occupied (KidsCount).

Philadelphia City is the largest of the five persistent districts with 341 schools and over 200,000 k-12 students. It is an urban district including all schools in Philadelphia. Philadelphia City is a diverse district with the top three languages other than English spoken at home are Spanish, Chinese and Arabic (Philadelphia City School District). 46% of the families with school-aged children in Philadelphia City live in two-parent households, 58% of those families have both parents in the labor force. 47% of these

families are families with a single mother, 68% of which are employed (Kids Count). The median household income is \$40,649 (QuickFacts) and in 2010 54% of homes in the district were owner-occupied (Kids Count).

Located between Harrisburg and Philadelphia, Reading School District is an urban school district in Southeastern Pennsylvania. Reading is the fourth largest school district in Pennsylvania and is the 6th largest employer in Berks County (Reading School District) where the median household income in 2017 was \$59,580 (QuickFacts). The district's 19 schools serve about 17,000 k-12 students who represent 28 different countries and speak 27 different languages (Reading School District). 52% of the families with a school-aged child in Reading live in two-parent households, 47% of those families having both parents in the workforce. 39% of these families are families with a single mother, 66% of which are employed. In 2010 42% of homes in the district were owner-occupied (Kids Count).

All five school districts are larger than the average Pennsylvania school district ranging from about 7,000 to 200,000 students. The smallest of the districts have over twice as many students than the average Pennsylvania district. The largest has sixty times more students. There are 500 school districts in Pennsylvania with average student enrollment in 2015/16 of 3,447 students. During the 2015/16 school year, over half of these school districts had less than 2,000 students enrolled, and an additional 222 districts had less than 7,000 students. All five of the school districts with a persistent shortage were in the top 35 largest school districts in Pennsylvania, serving more students than 93% of Pennsylvania school districts.

Almost all the districts are in Southeastern Pennsylvania. Erie City is the only district outside the region, located in the Northwestern corner of Pennsylvania. All are urban districts and serve a higher percentage of low-income students. They are all also more diverse than many Pennsylvania districts, with many languages spoken and a high percentage of minority students. Less than 30% of the adults above the age of 25 in each of the counties in which these districts are located have a bachelor's degree or higher and all these districts have a higher percentage of single mother households than the state average.

This study focused on the school and organizational characteristics that may be contributing to a school districts ability to attract and retain teachers to their district. The school-level characteristics looked at were size, socioeconomic status, standardized test scores, and student race/ethnicity. These characteristics were operationalized as total student enrollment, percent eligible for free and reduced lunch, percent proficient on reading and math standardized tests and student race/ethnicity. The organizational characteristics analyzed were salary, workload, and resources. These characteristics were operationalized as the district's average teacher salary, the percentage of students with disabilities (defined as a student with an Individualized Education Plan or a 504 Plan), the percentage of students identified as having a limited English proficiency and per-pupil expenditures.

Organizational Level Characteristics

Table 2-1: Organizational Level Characteristics of Districts with a persistent shortage, Adapted from Kids Count, NCES, Civil Rights Data Collection and OpenPAGov.

Organizational level Characteristics					
	Per Pupil Expenditure 2015/16	Average Teacher Salary 2015/16	Student to Teacher Ratio 2015	Students with a Limited English Proficiency 2015	Students with Disabilities 2015
Erie City	\$13,463	\$54,938	13.57	8.2%	19.7%
Harrisburg City	\$18,846	\$53,024	13.84	12.7%	17.5%
Lancaster	\$16,868	\$59,136	13.77	15.8%	18%
Philadelphia City	\$13,880	\$69,737	17.2	9.7%	16.6%
Reading	\$11,870	\$55,066	17.63	22.9%	20%
Pennsylvania Average	\$17,774	\$64,772	14 in 2014	3.1%	15.9%

Salary

Teachers who leave the profession because of dissatisfaction most often sight low salaries as one of the influences in their decision (Ingersoll 2002) and those who are satisfied with their salary are almost twice as likely to teach until retirement (Hughes 2012). Salary is also one of the many factors that employees weigh when deciding on a job (Prince 2002). Given the influence that salaries have on being able to recruit and retain a teacher, teachers' salaries of the persistent districts were analyzed. In general, the average teacher salaries of the districts with a persistent teacher shortage were below the state average, Philadelphia City School District was the only exception. Averaging \$58,580, the persistent districts average teacher salary was over six thousand dollars less than the state average.

Workload

Workload has been noted as a factor that influences a teacher's decision to leave. A commonly mentioned piece of the workload puzzle is class size, but it is not as often mentioned as a reason for leaving (Brill & McCartney 2008). On the other hand, an increased number of students with special needs, intuitively, would increase teacher workload. Therefore student-teacher ratio, the percentage of students identified as having a limited English proficiency and percentage of students with special needs were examined for each of the persistent districts.

For three out of the five school districts student-teacher ratios were just below the most recently available Pennsylvania average of 14-1. Both Reading and Philadelphia though were both above average by about three students per teacher. All five of the districts were far above the Pennsylvania average in percentage of students with a limited English proficiency. Their average limited English proficiency percentage is over four times more than that of the state (13.9 to 3.1 respectively). All five districts' percentage of students with disabilities were also above average. The districts averaged over two percent more students with disabilities than the state (18.36 to 15.9 respectively).

Resources

Lack of adequate facilities and recourse has also been cited as a reason for teachers to leave (Brill & McCartney 2008). Quality materials, resources, and facilities have been noted as factors contributing to teachers feeling supported. As teachers are considering the schools where they would like to teach, schools with adequate facilities would be more attractive to potential teachers. Newer buildings and available materials

would be positive benefits for a teacher choosing a place to work but schools with limited resources don't have the funds to spend updating facilities or on materials for students and staff, making them less attractive from the start of the application process.

District resources were operationalized as per-pupil expenditures and when they were analyzed, all but one of the districts with a persistent shortage had a per-pupil expenditure that was less than the state average (See Table 2-1). On average the districts spent almost three thousand dollars less per student than the state average (\$14,985.40 to \$17,774 respectively).

School Level Characteristics

Table 2-2: School Level Characteristics of Districts with a persistent shortage adapted from Kids Count and Civil Rights Data Collection. *Estimated by dividing the current Pennsylvania School enrollment by the number of school districts.

School Level Characteristics			
	Total Students 2015	Students Qualified for Free or Reduced Lunch 2015/16	Minority Students 2015
Erie City	13,698	100%	58.1%
Harrisburg City	7,519	100%	96.5%
Lancaster	11,405	93.5%	86.9%
Philadelphia City	204,060	100%	86.3%
Reading	18,348	100%	94%
Pennsylvania Average	3,447*	50.3%	32.5%

Socioeconomic Status

It has been found that higher rates of student poverty coincide with higher rates of teacher turnover (Hughes 2012) and high poverty was apparent in all five of the school districts with a persistent teacher shortage. All the school districts, except for Lancaster, had blanket enrollment in free or reduced lunch programs for their students. The average

of the five districts (95.5%) was more than twice the state average (45.6%). High poverty school districts are also likely to recruit new, inexperienced teachers (Flynt & Morton 2009) that have higher rates of departure (Ingersoll 2003).

Standardized Test Scores

Table 2-3: Percent of students proficient or advanced on the Reading Standardized Tests, adapted from OpenPAGov.

Percent Proficient or Advanced on Reading Standardized Tests						
	Erie City	Harrisburg City	Lancaster	Philadelphia City	Reading	State
3rd Grade	58	41	60	58	56	78
8th Grade	70	46	52	63	59	83
11th Grade	64	36	44	44	43	70

Table 2-4: Percent of Students proficient or advanced on the Math Standardized Tests, adapted from OpenPAGov.

Percent of Students Proficient or Advanced on Math Standardized Tests						
	Erie City	Harrisburg City	Lancaster	Philadelphia City	Reading	State
3rd Grade	71	45	64	67	69	84
8th Grade	65	34	49	57	67	79
11th Grade	50	29	33	38	27	62

Schools with above-average standardized test scores tend to retain more teachers (Hughes 2012). In 2017, all districts with a persistent shortage had a lower percentage of students who tested as proficient or advanced in both reading and math than the state average at all grade levels. By the time students in these districts reach their 11th-grade year, less than half (46.2%) score proficient or advanced on reading standardized tests and on average, only 35.4% of 11th graders in these districts scored at the proficient or advanced level in math.

Erie City had the highest percentage of 11th graders who were proficient or advanced on their reading standardized tests at 64%, 6% below the 70% state average. Over half of the students in the remaining districts did not meet reading proficiency by their 11th-grade year. Lancaster, Philadelphia, and Reading all had just over 40% of their 11th graders at the proficient level and Harrisburg had the lowest with 36%. Erie City also had the highest percentage of 11th graders who were proficient or advanced on their math standardized tests at 50%, which is still 12% below the state average. Philadelphia having the second highest percentage of proficient or advanced students at 38%. Only about a third of Lancaster, Harrisburg City and Reading students met math proficiency by their 11th-grade year. Reading has the lowest percentage with only 27% of their 11th graders reaching proficiency.

Race/Ethnicity

Teachers in schools with minority enrollments of at least 50 percent leave at twice the rate of teachers in schools with few minority students (Prince 2002). The districts examined here showed a similar trend. Ranging from 58% to 97%, all five districts had a high percentage of minority students. The districts that were identified as persistently having a shortage of teachers had, on average, a minority population of 84%, over twice the 33% of the state.

The data shows that the school districts in Pennsylvania that are persistently experiencing a teacher shortage have common school and organizational level characteristics. These are districts with teacher salaries, per-pupil expenditure and standardized test scores below the state average. The districts have a high student to

teacher ratio, serve a high percentage of minority students, students from low-income households, with special needs and have a larger student body than average.

Chapter 3

School Level Conditions as Indicators

The dramatic increase of Pennsylvania schools on the Teacher Shortage Area List in 2017/18 makes it clear that teacher shortages are a looming threat to Pennsylvania schools in the coming years. Being able to identify the school districts that are or will be in persistent need of teachers is critical for policymakers and school leaders to help address the effects of these teacher shortages. If districts were able to be identified before their revolving door is speed up to a critical or persistent level, interventions may be implemented. This would save schools money and retain better quality teachers that would be able to provide higher quality instruction to students. Therefore, the characteristics that were seen across all five of the school districts with a persistent shortage were compared to all the districts that appeared in the 2017/18 spike to identify where there may be a higher need soon and where intervention may want to focus.

The common characteristics described in the previous chapter between all districts with a persistent shortage included average teacher salary, the size of the district, student demographic information and standardized test scores. The trends within each of these characteristics were then used to identify districts with similar characteristics that may be at risk of remaining on the teacher shortage list. Allentown, Coatesville Area, and Hazleton Area School Districts all have shown characteristics like the districts with a persistent shortage in nine out of ten of these areas and thus are seen to be at risk of having a persistent teacher shortage.

Allentown School district is a large urban school district with 22 schools and about 17,000 students (Common Core of Data). The district has 3 high schools, 4 middle schools, 14 elementary schools, and an early childhood center, the Newcomer Academy for students who are attending school in the U.S. for the first time, two alternative education schools and a virtual academy (Allentown School District). About half (54%) of school-aged students come from a household with two parents and 62% of the time both of those parents are in the workforce. Just over half of the residents of this district (52%) rent a home (Kids Count) and they have a small minority student population of about 17% (Civil Rights Data Collection).

Coatesville Area is a rural school district in Chester County. The median household income in Chester County is \$92,417 and just over half (51%) of the adults over the age of 25 have a bachelor's degree or higher (Quick Facts). They have about 7,000 PreK-12 students in 13 different schools (Common Core of Data). Most of the school-aged children (70%) come from a household with two parents and both of those parents are in the workforce most of the time (71%). Almost two-thirds of the residents of this district own their home (Kids Count) and about half of the students they serve are minority students (Civil Rights Data Collection).

Hazleton Area School District is a suburban school district covering over 200 square miles, touching Luzerne, Carbon and Schuylkill counties. It is one of the largest school districts in the state, serving over 10,000 k-12 students in 13 different schools and employing over 700 teachers (Hazleton Area School District). Just over half of the students in Hazleton are minority students (See Table 3-2) and about half of those students (48%) identify as Hispanic or Latino (Civil Rights Data Collection). Two-thirds

of the school-aged children in the district have two parents at home and most of those parents are in the workforce (66%). In 2010, 69% of the residents resided in the house they own and almost a third (31%) rent (Kids Count).

Table 3-1: School Level Characteristics of Districts at risk of a persistent shortage adapted from Kids Count and Civil Rights Data Collection. *Estimated by dividing the current Pennsylvania School enrollment by the number of school districts.

School Level Characteristics					
	Total Students 2015	Students Qualified for Free or Reduced Lunch 2015/16	Minority Students 2015	Percent of 11 th Graders Proficient or Advanced in Math	Percent of 11 th Graders Proficient or Advanced in Math
Allentown	17,006	64.6%	16.8%	24	31
Coatesville Area	7,199	56.8%	51.3%	38	47
Hazleton Area	10,560	100%	52%	30	42
Pennsylvania Average	3,447*	50.3%	32.5%	62	70

Table 3-2: Organizational Level Characteristics of Districts at risk of a persistent shortage, Adapted from Kids Count, NCES, Civil Rights Data Collection and OpenPAGov.

Organizational level Characteristics					
	Per Pupil Expenditure 2015/16	Average Teacher Salary 2015/16	Student to Teacher Ratio 2015	Students with a Limited English Proficiency 2015	Students with Disabilities 2015
Allentown	\$9,961	\$65,021	17.4	12%	16.8%
Coatesville Area	\$10,579	\$65,853	16.8	5.6%	20%
Hazleton Area	\$10,121	\$62,410	13.77	13.9%	11.2%
Pennsylvania Average	\$17,774	\$64,772	14 in 2014	3.1%	15.9%

All three of the school districts have a per-pupil expenditure that is about \$7,000 below the state average. Allentown School District having the lowest at \$9,961. Allentown and Coatesville area both have average teacher salaries slightly above the state average, but Hazleton comes in about \$2,000 below. Both Allentown and Coatesville Area have a student to teacher ratio higher than the state average where Hazleton is slightly below with 13.44. All three school districts have a higher percentage of students with a limited English proficiency. Hazleton having the highest at about four times the

state average. Coatesville has the smallest population with a limited English proficiency but is still 2% higher than average. Hazelton is the only school to have fewer students with disabilities than the average. Allentown is only slightly above average at 16.8%. Coatesville, however, has 5% more students with disabilities than the state average.

Each of the school districts is large compared to the state average. Coatesville is the smallest and is still about twice the size of an average school district in Pennsylvania. The size of these districts is uncommon for Pennsylvania. Allentown is the third largest school district in Pennsylvania. Hazelton area the 14th and Coatesville the 23rd largest school district making all the school districts in this study in the top 35 largest school districts in the state. A striking finding in a state with 500 school districts.

All three also serve more low-income students, Hazelton Area having the most, followed by Allentown and then Coatesville that is still about 5% higher than average. Both Coatesville and Hazelton have about 20% more minority students than the state average, Allentown being the only district with less than the average. Finally, all three school districts have about half as many 11th graders who are proficient or advanced on their Math and Reading standardized tests.

Overall, all three districts are large districts with above state average student enrollment and a high percentage of students with a limited English proficiency. Most also have high students to teacher ratios and more minority and low-income students. They also have below average per-pupil expenditures and a lower percentage of students who are proficient or advanced on reading and math standardized tests by their 11th-grade year. All three districts average teacher salary are very close to average. Allentown and Coatesville also have an above state average percentage of students with disabilities,

Hazelton being the only of the three that is slightly below. The three districts, however, do differ in their urbanicity. Allentown is an urban district, Coatesville Area is rural, and Hazelton is suburban.

The school and organizational level characteristics Allentown, Coatesville Area, and Hazelton Area school districts display closely mirror those of the districts that were identified as having a persistent teacher shortage over the past decade. This leads one to believe that they too could be at risk of having a persistent shortage in the coming years. Policymakers and school level leaders should be aware of districts like these when considering teacher shortage interventions. Early intervention in these districts could not only save the district's money but improve the quality of education students in those districts receive.

Chapter 4

Implications of the Revolving Door of Teachers

The “teacher shortage” question has been in the policy stream from the past few decades but the term itself can be somewhat misleading. It is not that the U.S. is in short supply of all teachers, the issue resides in the distribution of those teachers and how long they are retained. Studies on teacher shortages have shown us that it is not that there is a lack of trained teachers, it is that that they are not necessarily trained in what is needed and they are not being retained into the schools that desperately need them.

Studies have shown that schools with the school and organizational characteristics that were highlighted in this study are more likely to experience a “revolving door” of teachers coming and going from their classrooms given their inability to attract and retain teachers. These are districts that perform poorly on standardized tests, have a large minority population, and serve a high proportion of students in poverty. This revolving door to these schools has been in motion for some time now but as attrition rates continue to increase by about one-third for first-year teachers over the past two decades (Ingersoll 2012), disadvantaged schools are desperate to fill empty classrooms.

But these classrooms rarely go unfilled, instead disadvantaged districts are constantly hiring less-qualified teachers (Brill & McCartney 2008) so that there is someone there to teach the students. “Over the past three years, thousands of classes in Los Angeles, New York City, Chicago and other major urban areas opened with substitute teachers who were not qualified or appropriately prepared for their teaching

tasks.” (Shakrani 2008) Students who attend these “disadvantaged” schools are being exposed to inconsistent, inexperienced or unqualified teachers, while their districts are spending more money to get “a breathing body” (as one principal stated he was lucky to have (Prince, 2002)) in the classroom.

Student Outcomes

Scholars have also noted the influence a highly qualified teacher can have on their students. Though highly qualified, is tough to define, certification status and knowledge of the content area (McLeskey & Billingsley 2008) and years of experience are often cited as key components of what can make a teacher “highly qualified”. But the high turnover rates that many teacher shortage areas are currently plagued with are forcing classrooms to be filled with inexperienced or even unqualified teachers.

The first year of teaching is often described as being chaos as many first-year teachers are not confident in their abilities and are still getting to know the school environment. When a school experiences this revolving door of new and inexperienced teachers, they are left with “perpetual chaos.” (Guin 2004) as they try to manage the effects of a “revolving door” of teachers. This includes both the financial burden and the discontinuity that is detrimental to building sustainable and trusting relationships among teacher, students, and families (Castro et al. 2018).

There is no interaction that is more critical than between a student and teacher (Brill & McCartney 2008) but the quality of that interaction significantly influences student outcomes, including their future earning potential. A good teacher (one at the 60th

percentile), compared to an average teacher, can raise a class of student's lifetime earnings by \$106,000. A teacher at the 69th percentile can double that at a \$212,000 increase. A high performing teacher (in the 84th percentile) can raise their classes' future earnings by \$400,000. On the other end, a low performing teacher (at the 16th percentile) can have a negative impact of \$400,000 (Hanushek 2011). But as low-performing schools are continuing to have a hard time retaining these high performing teachers, they are going to continue to have a hard time closing these future income gaps.

Cost of Attrition

Another concern about such high attrition rates is the expense it is imposing on already disadvantaged school districts. When a high-quality teacher leaves a low performing school, it can take eleven hires to find another teacher of their quality, compared to six at an average performing school (The Irreplaceables 2012). This means it is almost twice as difficult for disadvantaged schools to find high-quality replacements for every high-quality teacher they lose. Finding, hiring, and training new teachers is a significant financial burden on districts that are already stretching their resources. Nationally attrition is estimated to cost about \$2.2 billion per year and an additional \$4.9 billion per year for replacing teachers who move to a different school, totaling over 7 billion dollars every year.

The Learning Policy Institute breaks down the cost of replacing a teacher into separation costs, recruitment and hiring costs and training cost. Separation costs include removing a teacher from payroll and health plans, retirement contributions, paying

substitutes to cover mid-year departures and conducting exit surveys. Recruitment and hiring costs include advertising positions, job fairs, corresponding with applicants, interviews, background checks and adding new teachers to payroll and benefits programs. Training costs including introducing new teachers to policy and procedures, mentoring programs and onboarding professional development.

These costs are not evenly distributed across states or districts. The 1999/2000 NCES Statistics Schools and Staffing survey showed that Texas, the state with the highest attrition rate in the U.S. spent \$505 million on replacing teachers that year while Ohio spent almost half that at \$206 million (Shakrani 2008). It has been estimated that on average a teacher leaving a small rural school district costs \$4,366 and \$17,872 for large districts (Castro et al. 2018) and the Learning Policy Institute states that an urban spends over \$20,000 on every new higher.

A pilot studying on the cost of teacher turnover in five districts found that a single school district with almost 5,000 leavers and 3,000 movers, spent over 45 million dollars on teacher turnover in a single year (Barnes et al. 2007). Given how disproportionately teacher turnover effects already struggling districts, these scare funds being spent on hiring new teachers when they could be spent on improving working conditions and the below average compensation for current teachers and improve retention.

Policy suggestions

The reality is that it doesn't matter how many new teachers are being supplied if such a large percentage of them are leaving within the first few years. As one article

explained, “Pouring water into the bucket will not do any good if we do not patch the holes first.” (Ingersoll and Smith 2003). Therefore, it is critical to focus on keeping teachers in these “hard to staff” school districts.

One of the most frequently cited ways to retain teachers to these districts is financial incentives. This ranges from loan forgiveness and housing or childcare subsidies to raising teacher salaries as a form of “combat pay”. Even though teachers cite salary as the main reason for leaving the field, minor salary increases would not be enough to keep them in the classroom. A 2% decrease in attrition rates would require a 50% salary increase (Brill & McCartney 2008), which is nearly impossible given the limited resources of our public schools.

Therefore, many scholars point to improved teacher induction programs for incoming teachers that includes mentoring, professional development and administrative support and supervision to increase retention. They believe that the "costs of induction programs would at least be partially offset by an increase in teacher retention and subsequent decreases in the cost of turnover and attrition." (Shakrani 2008). Chicago Public Schools was highlighted as an example of this in a 2007 case study. The district spent \$17,872 on every teacher that left but an effective induction program would only cost \$6,000 per teacher. Showing that the implementation of quality teacher induction programs would save the district millions of dollars in teacher turnover costs every year (Barnes et al 2007).

Having little interaction with colleagues on a day to day basis makes teaching isolating, especially for young teachers. The recent influx of “green” teachers makes it critical that districts are responding to the needs of their young teacher and giving them

the tools, they need to survive in the field. Comprehensive induction programs can provide these supports for new teachers, increasing the chances that they are retained. Currently, many states require some form of an induction program for new teachers, but the components of these programs vary.

Ingersoll (2012) found that the most common induction activities are facetime with their administrator, having a mentor teacher, a beginner's seminar, and common planning time with a team of teachers, a teacher's aid or a reduced course load. Beginning teachers who receive the most common combination of supports, a mentor teacher and administer feedback, were retained at a slightly better rate than those who got no supports. But a comprehensive package containing all these supports reduced first-year attrition by 50%. In general, he found that induction activities had a positive effect on teacher retention.

Teacher induction programs are designed to get at the root of teacher dissatisfaction by helping young teachers improve their own skills and creating a community of educators who are committed the quality of education students receive and that moving away from a "sink or swim" environment to help cultivate more successful teacher. By improving teacher induction programs, districts would be supporting the "green" teachers currently coming into the profession long enough to facilitate a more effective learning environment for students and new teachers. This new environment wouldn't change the financial of demographic realities of the districts but would arm the teachers in these districts with what they need to feel that they are successful and remain in the schools that need them the most.

References

- “Allentown School District.” *Home - Allentown School District*, www.allentownsd.org/home.
- “Coatesville Area School District / Homepage.” / *Homepage*, www.casdschools.org/.
- “Hazleton Area School District / Overview.” *Hazleton Area School District / Overview*, www.hasdk12.org/.
- “What's the Cost of Teacher Turnover?” *Learning Policy Institute*, learningpolicyinstitute.org/product/the-cost-of-teacher-turnover.
- Aragon, Stephanie. *Teacher Shortages: What We Know*. Education Commons of the States, 0AD, *Teacher Shortages: What We Know*
- Barnes, Gary, et al. *The Cost of Teacher Turnover in Five School Districts: A Pilot Study*. National Commission on Teaching and Americas Future, 2007.
- Brill, Sam, and Abby McCartney. “Stopping the Revolving Door: Increasing Teacher Retention.” *Politics & Policy*, vol. 36, no. 5, 2008, pp. 750–774., doi:10.1111/j.1747-1346.2008.00133.x.
- Castro, Andrene, et al. *Addressing the Importance and Scale of the U.S. Teacher Shortage*. University Council for Educational Administration, 2018, *Addressing the Importance and Scale of the U.S. Teacher Shortage*.
- Common Core of Data*, National Center for Education Statistics, nces.ed.gov/ccd/districtsearch/.
- Cowan, James, et al. “Missing Elements in the Discussion of Teacher Shortages.” *Educational Researcher*, vol. 45, no. 8, 2016, pp. 460–462., doi:10.3102/0013189x16679145.
- Cross, Freddie. *Teacher Shortage Areas Nationwide Listing 1990-1991 through 2017-18*. U.S. Department of Education, 0AD, *Teacher Shortage Areas Nationwide Listing 1990-1991 through 2017-18*.
- Darling-Hammond, L. (1984). *Beyond the commission reports: The coming crisis in teaching*. Santa Monica, CA: Rand Corporation
- ERIE'S PUBLIC SCHOOLS*, Blackboard, Inc., www.eriesd.org/.
- Flynt, Samuel W, and Rhonda Collins Morton. “The Teacher Shortage in America: Pressing Concerns.” *National Forum of Teacher Education Journal*, vol. 19, no. 3, 2009, pp. 1–5.
- Guin, Kacey. 2004. “Chronic Teacher Turnover in Urban Elementary Schools.” *Education Policy Analysis Archives* 12 (42): 1-30.
- Hanuchek, Eric A. “Valuing Teachers.” *Education Next*, ser. 2011. 2011.
- Harrisburg School District*, West Corporation, www.hbgasd.k12.pa.us/home.

Hughes, Gail D. "Teacher Retention: Teacher Characteristics, School Characteristics, Organizational Characteristics, and Teacher Efficacy." *The Journal of Educational Research*, vol. 105, no. 4, 2012, pp. 245–255., doi:10.1080/00220671.2011.584922.

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, 60 (8), 30–33.

Ingersoll, Richard M. "Beginning Teacher Induction What the Data Tell Us." *Phi Delta Kappan*, May 2012, pp. 47–51. kappanmagazine.org

Ingersoll, Richard M. "The Teacher Shortage: A Case of Wrong Diagnosis and Wrong Prescription." *NASSP Bulletin*, vol. 86, no. 631, 2002, pp. 16–31., doi:10.1177/019263650208663103.

Ingersoll, Richard. (2003). Is There Really a Teacher Shortage?. CPRE Research Reports.

Kids Count Data Center, Annie E. Casey Foundation, 2019, datacenter.kidscount.org/.

Meleskey, James, and Bonnie S Billingsley. "How Does the Quality and Stability of the Teaching Force Influence the Research-to-Practice Gap? A Perspective on the Teacher Shortage in Special Education." *Remedial and Special Education*, vol. 29, no. 5, 2018, pp. 293–305.

OpenPAGov, Commonwealth Foundation for Public Policy Alternatives, Inc, www.openpagov.org/.

Prince, Cynthia D. 2002. "The Challenge of Attracting Good Teachers and Principals to Struggling Schools." *American Association of School Administrators* (January)

QuickFacts, U.S. Census Bureau, www.census.gov/quickfacts/fact/table/US/PST045218.

Reading School District, Blackboard, Inc., www.readingsd.org/.

Sawchuk, Stephen. "Colleges Overproducing Elementary Teacher, Data Find." *Education Week*, vol. 32, no. 18, 23 Jan. 2013, pp. 1–15.

School District of Lancaster, School District of Lancaster, www.lancaster.k12.pa.us/.

Serpell, Zewelaji, and Leslie A. Bozeman. 1999. "Beginning Teacher Induction: A Report on Beginning Teacher Effectiveness and Retention." National Partnership for Excellence and Accountability in Teaching (November).

Shakrani, Sharif. *Teacher Turnover*. Education Policy Center, 2008, pp. 1–4, *Teacher Turnover*.

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S. Palo Alto, CA: Learning Policy Institute.

The Irreplaceables Understanding the Real Retention Crisis in America's Urban Schools. TNTF, 2012, pp. 1–46

The School District of Philadelphia, The School District of Philadelphia, www.philasd.org/.