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Article

Examining the Moderating Effect of Teacher Experience on Academic Achievement in Urban Schools: A Critical Spatial Analysis of Access

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Abstract

This study investigates the moderating effect of teacher experience on academic achievement in urban schools, focusing on the comparison between Texas and Tennessee. Using critical race spatial analysis (CRSA), the research maps the geographic distribution of experienced teachers in urban areas and examines how this distribution relates to student demographics and academic outcomes. Findings reveal that students in historically marginalized communities often have less access to experienced teachers, contributing to persistent achievement gaps. The study provides insights into how the unequal distribution of experienced educators perpetuates educational inequities, particularly in communities of color. By examining Tennessee's urban education context as a mirror for Texas, the paper highlights the broader implications for state policy and educational reform. These results underscore the need for systemic efforts to ensure equitable access to experienced teachers in urban schools, aiming to improve academic outcomes for all students.

Keywords: urban schools, spatial analysis, equity, access

Introduction

High-quality schools play an important role in the short- and long-term success of students (Chetty et al., 2011, 2014, 2016), and research has suggested that it is the teacher who largely contributes to school quality and student success (Aaronson et al., 2007, Blizard, 2021; Croninger et al., 2007; Harris & Sass, 2011; Nye et al., 2004). Experienced teachers are the most likely to have the greatest influence (Blizard, 2021). Despite the significance of experienced teachers, students from neighborhoods that sustain high rates of poverty are most likely to contend with high rates of teacher turnover and have minimal access to experienced teachers (Haberman, 2005; Hill-Jackson et al., 2019). This is seemingly evident in Knoxville, Tennessee. Knoxville and the greater Knoxville area (known as

Knox County) is located along the Tennessee River and is home to almost 500,000 residents. This urban emergent city (see Milner, 2012) contains Knox County Schools (KCS) which serves over 60,000 students. At the end of the 2021-2022 school year, KCS was able to retain about 88% of their teachers. However, the schools located in neighborhoods with the highest rates of poverty in the city retained less than 68% of their teachers from the 2021-2022 to 2022-2023 school year (Tennessee Department of Education [TnDOE], 2023).

Because of the limited access that some students have to experienced teachers, this study aims to explore the relationship between student demographics, including race/ethnicity and socioeconomic status, and student achievement while also examining whether teacher experience moderates this relationship. The present study will then draw on spatial analysis to map the geographic distribution of experienced teachers across the Knoxville metropolitan area. This visualization will enable a critical spatial analysis of the extent to which students from financially disadvantaged neighborhoods and/or students of color are provided with opportunities for improved educational outcomes. To accomplish this, it is important to first understand the role that context, teacher experience, and school zone catchment play in student achievement. Then, using a regression analysis and critical race spatial analysis, students' access to high quality teachers will be explored. Lastly, a discussion of the findings will provide implications for policy makers and school leaders seeking to create more equitable spaces for students from historically marginalized communities.

By understanding the impact that experienced teachers have on students from historically marginalized and minoritized communities alongside the current distribution of these teachers within an urban emergent school district, stakeholders across the United States will be better informed as they seek to address the hiring and retention of experienced teachers across neighborhoods.

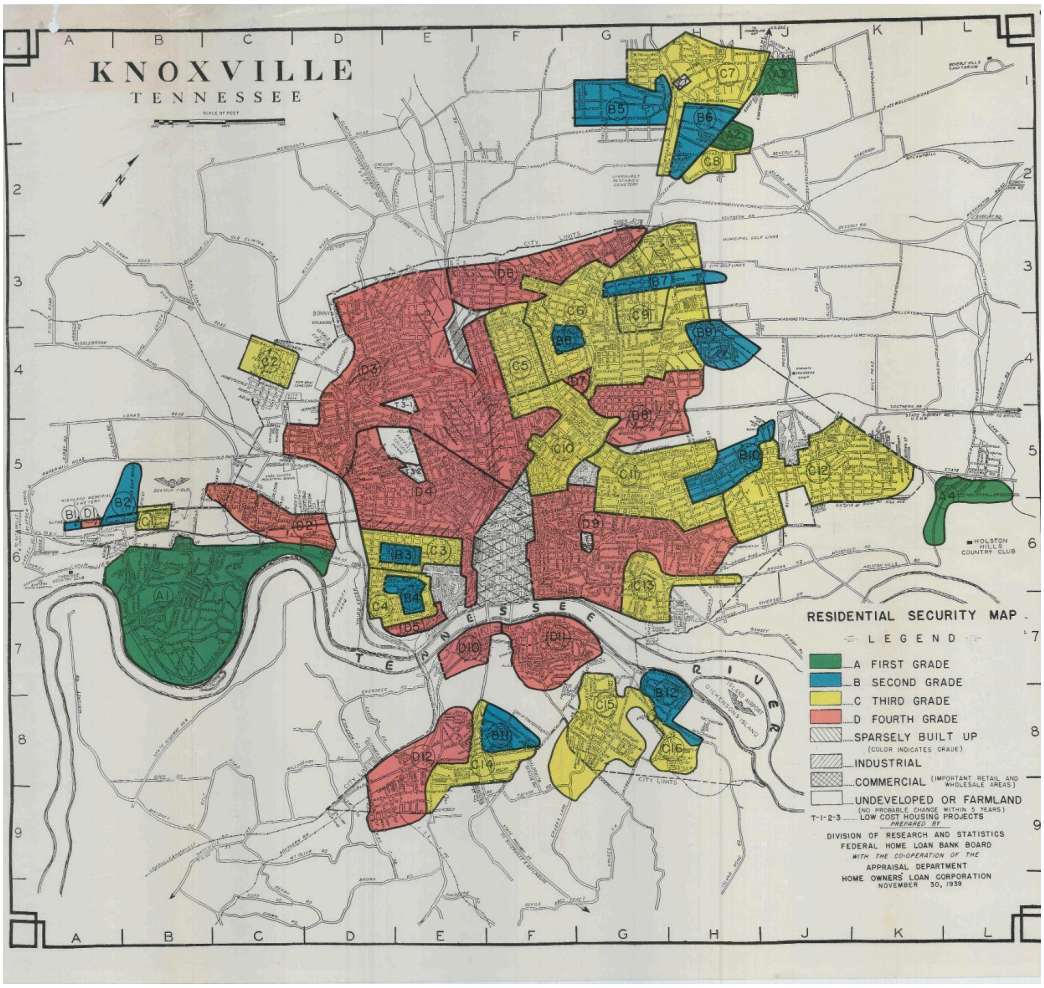
Literature Review

The Role of Context in Knoxville

Historically, Knoxville was an industrial city with prominent factories, natural resources, and a railroad hub that provided access north to south and east to west (Knoxville History Project, n.d.). After the Civil War and Emancipation, many freed African Americans relocated to Knoxville seeking work and housing in the flourishing city. However, as the number of Black residents expanded, the city became increasingly segregated as redlining and Jim Crow further exacerbated the separation of White and Black families. Figure 1 shows a redlining map created by the Homeowners' Loan Corporation in 1939. During this time, financial institutions and realtors across the United States would work together to create maps to indicate which neighborhoods within a city were most desirable and which were least desirable (Rothstein, 2017). Neighborhoods that were home to mostly Black and/or families with lower household incomes were redlined, making it nearly impossible to get a mortgage and limiting opportunities for the creation of generational wealth.

Figure 1

Knoxville redlining map from 1939

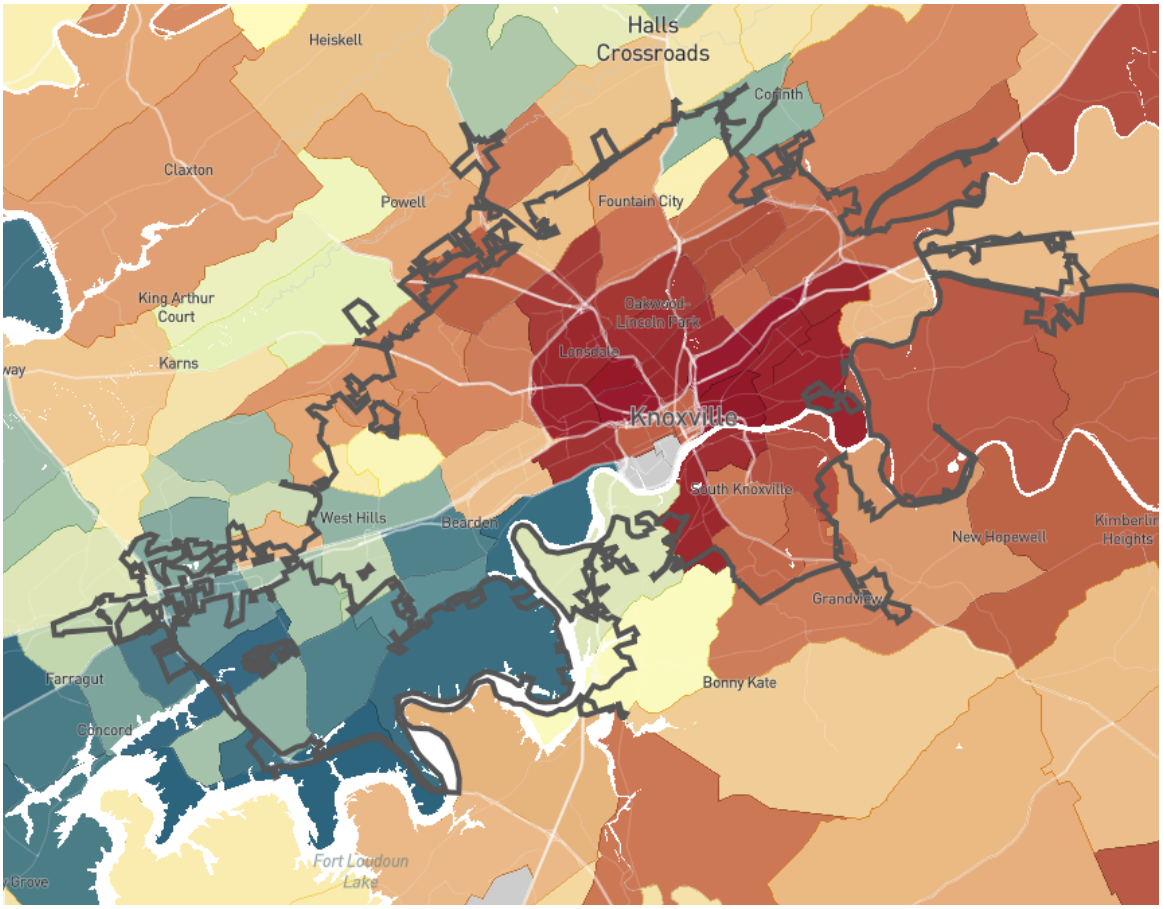


Despite being forced into redlined neighborhoods, economic progress within the Black community burgeoned. Mostly located in East Knoxville, the community built businesses, homes, and churches, creating a self-sufficient area of Knoxville that thrived in spite of city ordinances and state laws promoting segregation (Crawford, 2021). Then beginning in 1959, Knoxville began several Urban Renewal Projects, funded by Title I of the Housing Act of 1949. Urban Renewal was intended to eliminate slums and substandard housing, but it largely targeted communities of color, primarily through eminent domain resulting in the decimation of the Black community. Across the county, urban renewal impacted urban areas across the United States as federal subsidies favored suburban development and highway infrastructures while devaluing stable urban neighborhoods (Bierbaum, 2021). In Knoxville from 1959-1974, Urban Renewal destroyed 107 African American businesses, 15 historical Black churches, and displaced over 2500 families, 70% of whom were African American (Beck Center, 2024).

Urban Renewal made it nearly impossible for the Black community to rebuild. Those displaced were forced into public housing after they lost their jobs and private homes. Today there is still evidence of the generational impacts that this project had on East Knoxville. Figure 2 shows a map of Knoxville from The Opportunity Atlas. The Opportunity Atlas presents a visual representation of data collected from the US Census Bureau and represents children's median income earning in adulthood based on the neighborhood in which they were born. The map of Knoxville today does not look too different from the redlining map created almost 100 years ago. The color of the neighborhoods on these maps represents the income inequality that still exists today.

Figure 2

Opportunity Atlas map showing present-day Knoxville



The current makeup of Knoxville neighborhoods is reflected in the schools. As a district, Knox County's enrollment by race/ethnicity is 67% White, 16.0% Black or African American, 12% Hispanic/Latino, 2.3% Asian or

Asian Pacific Islander, and about 6% two or more races (US News, 2024). However, schools in the formerly red-lined neighborhoods of East Knoxville represent over 65% Black or African American students and 12% White, 11% Hispanic/Latino, and 10% two or more races, indicating continued segregation of historically marginalized families in the city.

Although income inequality and school segregation are evident, one way to subvert this reality across neighborhoods might be educational opportunity. In a study by Chetty et al. (2011), students who were assigned to high quality classrooms from kindergarten through third grade earned more in adulthood and were more likely to own a home. High quality schools can substantially increase the academic achievement of students whose family has limited access to financial resources and the increased academic achievement of students contributes to later success both educationally and financially (Chetty et al., 2014, 2016). In the Harlem Children's Zone, students from families with limited access to financial resources exhibited significant increases in achievement after being enrolled in the high-quality schools of the Zone (Dobbie & Fryer, 2011). This study in an urban context demonstrates the effectiveness of high-quality schools in upward economic mobility of students and demands a closer look at the factors that contribute to a school being high quality.

The Role of Teachers in School Quality

So, what makes a school (or classroom) high quality? Teachers. Overwhelmingly teachers matter and opportunity in high quality schools can largely be attributed to the teachers in those schools (Aaronson et al., 2007, Blizard, 2021; Croninger et al., 2007; Harris & Sass, 2011; Nye et al., 2004). Teacher quality has been shown to have strong positive effects on student achievement, especially for students from historically marginalized communities (Aaronson et al., 2007). Students assigned to high-quality teachers were more likely to attend college and earn higher salaries in adulthood (Chetty et al., 2016) demonstrating the role of the teacher in later student success.

Instrumental to teacher quality is years of experience. The percentage of experienced teachers at a school is a statistically significant predictor of school success (Blizard, 2021), and experienced teachers are more likely to improve math and reading skills (Harris & Sass, 2011), boost student achievement (Nye et al., 2004), and impact learning especially in the early grades (Croninger et al., 2007). Alongside school success, Nye et al. (2004) found that teachers' effects on student achievement was most significant in schools that were located in communities with limited access to financial resources. This impact was more important than in those schools located in

neighborhoods with greater access to financial resources. Teacher experience was positively associated with student achievement and statistically significantly related to student achievement in second and third grade (Nye et al., 2004). Unfortunately, not all students have access to experienced teachers solely because of the neighborhood in which they live and the role that school catchment zones play in determining student access to local schools (Richards & Stroub, 2015; Siegel-Hawley, 2013).

The Role of School Zoning in Educational Access

The carry-over of redlining continues to plague urban areas and seems to be most evident when considering the construction of district and school zoning maps (Hannah-Jones, 2014; Owens, 2018; Saparito, 2017; Yuhas, 2015). On the macro level, income segregation between school districts is evident. Termed the "income achievement gap," Owens (2018) found that differences in achievement between Black and White students was related to their access to resources within their zoned districts. In this study, high-income students performed better than low-income students performing worse. This gap widened as the income segregation between districts increased. Income segregation creates districts wherein White wealthy families are able to access the greatest educational resources, whereas Black families earning the same high incomes do not have access to the same resources within their districts. This increasing income stratification in conjunction with racial inequality in neighborhood makeup may reduce the ability for economic mobility and challenges the idea of educational opportunity (Owens, 2018).

On the micro level there also appears to be income segregation within districts between school catchment zones (Richards & Stroub, 2015; Saporito, 2017; Siegel-Hawley, 2013). Researchers have found that districts can draw irregularly shaped school catchment zones as a way of gerrymandering to segregate children (Richards & Stroub, 2015; Siegel-Hawley, 2013). However, even in districts that do not utilize irregularly shaped school catchment zones, the more compact these school zones are, the more likely they are to preserve economic advantages for families with higher incomes (Saporito, 2017). Regardless of how they are delineated, school catchment zones remain the primary method through which students are assigned to public schools. "The tight link between school zones and economically segregated schools has implications for inequality in students' access to resources that bear on academic achievement" (Saparito, 2017, p. 1367). This bearing may not only relate to access to resources but also students' access to teachers with more years of experience. It has been well documented that high-poverty schools sustain the highest rates of teacher turnover (Haberman, 2005; Hill-Jackson et al., 2019). This

results in students' diminished access to experienced teachers affecting their academic performance (Blizard, 2021; Nye et al., 2004).

Given the research that suggests that neighborhood segregation may limit educational opportunity (Owen, 2018), the role that the teacher plays in subverting this reality is worth investigating. Considering that children who are placed in classrooms with high quality teachers have been shown to not only exhibit short-term academic success but also long-term upward economic mobility, this study seeks to understand the moderating effects of teacher quality on the relationship between student achievement and student demographic followed by the examination of the distribution of high quality teachers across Knoxville public schools. The regression analysis paired with the survey of teacher location can help to highlight the needs of the differing neighborhoods throughout the city.

Current Study

The present study is twofold. Part one seeks to understand the relationship between students' demographics (including race/ethnicity and socioeconomic status) and student achievement and whether teacher experience serves as a moderating effect on this relationship. The second portion of this study will use critical race spatial analysis (CRSA) to observe the geographic distribution of experienced teachers layered with the variables of neighborhood demographic (race/ethnicity and socioeconomic status) information. When paired with regression analysis, CRSA can aid in the visualization of statistical data to understand the accessibility of high-quality teachers to those students who most benefit.

This visualization of data across the Knoxville metropolitan area will allow for the critical spatial analysis of the degree to which students from neighborhoods with limited access to financial resources are afforded opportunities for improved educational outcomes. While Knoxville presents its own unique context, the historical underpinnings of redlining and later urban renewal are a history all too common in urban areas across the United States. The geographic fragmentation of Knoxville is analogous to the school district's use of zones and regions to determine student enrollment in a particular school. Therefore, this study will rely on geographic information systems (GIS) software as a tool and CRSA as a framework to examine the dispersion patterns of teachers by neighborhood and campus demographics. Unlike statistical analysis alone, GIS provides a structure wherein the relationship between variables can be explored across a geographic region (Hogrebe & Tate, 2012; Schultz, 2014) allowing for the visual display of students' access to educational opportunity. The research questions are as follows:

Is the relationship between student demographics and student achievement moderated by teacher experience?

How are experienced teachers dispersed across neighborhoods in Knox County Schools?

How does this dispersion expand or limit access to those students who may benefit most from having a teacher with more experience?

Methods and Data

Critical Race Spatial Analysis

One way to observe the placement of high quality teachers alongside student access based on demographic data is with critical race spatial analysis (CRSA). Spatial analyses are conducted using mapping technology called geographic information systems (GIS), or software that "analyzes and displays geographically referenced information" (Cobb, 2020, p. 98). Geographers and urban planners have been using GIS for decades (Vélez & Solórzano, 2017), however spatial analysis has become a useful tool for researchers seeking to examine issues and outcomes within the sphere of educational research (Cobb, 2020; Hogrebe & Tate, 2012; Holtz, 2023; Schultz, 2014; Williams et al., 2022). Educational inequities based on race/ethnicity and socioeconomic status have been well documented in the research literature (Annamma et al., 2017; Bell, 1989; DeCuir & Dixon, 2004; Du Bois, 1899; 1935) so educational researchers utilizing GIS are challenged to take a critical approach to mapping as they seek to demonstrate how space is structured to uphold the color line as a means to bisect or obscure boundaries for the benefit of one group over another (Du Bois, 1903; Soja, 2008; 2010). Through the lens of CRSA, the researcher can "spatially examine how structural and institutional factors influence and shape racial dynamics" (Solórzano & Vélez, 2016, p. 429-430).

Williams et al. (2022) employed CRSA to identify inequities and opportunities for transformation within education to reaffirm Milner's (2012) urban education typology. Williams et al. (2022) remind researchers to deeply consider how the examinations of schools in space should be contextualized not only in terms of the physical, but also the racialized and social. Similarly, Puente (2022) applied CRSA to examine the color line surrounding the San Joaquin Valley, California's most prominent agricultural region and a space historically settled by Mexican migrant workers, to uncover the "intersections of rurality, Latinx identity, and college (in)opportunity" during the COVID-19 pandemic (p. 305). Rodríguez et al. (2016) utilized spatial analysis to measure equity variability across schooling spaces in the Borderlands of New Mexico, allowing for policy recommendations centered on systems of educational

equity to prevail. The ability of CRSA to not only explore the color line, but to create an intersection between the color line and other forms of marginalization creates an opportunity wherein mapping can be employed.

Variables

This study utilized data from the Tennessee Department of Education (TnDOE) Teacher Retention Report, Educator Experience Report, and the Tennessee Value-Added Assessment System (TVAAS) composite scores for literacy and numeracy from the 2022-2023 academic year. Likewise, demographic data included 2022-2023 census data from the US Census Bureau. Variables included percentage of experienced teachers, the literacy and numeracy composite scores, percentage of students receiving free and reduced lunch, and the percentage of students of color across 85 schools in KCS. For the CRSA, the surrounding neighborhood demographics will be included as collected from the US Census Bureau. Neighborhood level data from the US Census Bureau is encrypted upon collection while data from the TnDOE is collected in accordance with FERPA and other relevant privacy laws and policies ensuring that participants' privacy is protected.

High quality teachers. For the purpose of this study, "high quality teachers" will be measured by looking at schools that have a high percentage of experienced teachers (teachers with three or more years of teaching experience and a teaching certificate).

Literacy and Numeracy Composite Scores. Composite scores are reported on a scale of one to five and include assessment data across grade level (kindergarten through twelfth grade). These scaled scores demonstrate progress towards the growth standard, with level five being the most significant growth with the majority of students making more progress than the growth standard and level one being the least effective, demonstrating that a school's students made less progress than the growth standard.

Free and reduced lunch. For the current study, free and reduced lunch will serve as a proxy for socioeconomic status and is reported as the percentage of students who are eligible to receive this service within the school.

Students of color. Students of color are reported as the percentage of American Indian/Alaska Native, Asian, Black/African American, Black/Hispanic/Native American, Hispanic, and/or Native Hawaiian/Other Pacific Islander within a school. This grouping is how the state of Tennessee reports demographics for each campus.

Neighborhood demographics. Neighborhood demographics will include the race/ethnicity and median household income by neighborhood (census tracts of up to 250 individuals) as pulled from the US Census Bureau.

Data Analysis

Data were downloaded from the TnDOE and uploaded to STATA/SE 17.0 for the analysis. For the current study, a moderated regression analysis was performed as a means to test how the moderated variable (teacher experience) affects the relationship between student demographics (students of color or socioeconomic status) and student achievement (TVAAS composite score). To test the moderation effect, interaction terms between student demographic variables and teacher experience were created. Then a multiple regression analysis was conducted with the dependent variable (TVAAS composite score) and the main effects of percentage of students of color in a school, percentage of students qualifying for free or reduced lunch in a school, the percentage of teachers with at least three years of teaching experience as well as the interaction terms. The model is indicated below:

$$\text{TVAASComposite}_i = B0 + B1(\text{students of color}) + B2(\text{socioeconomic status}) + B3(\text{teacher experience}) + B4(\text{students of colorXteacher experience}) + B5(\text{socioeconomic statusXteacher experience}) + \varepsilon_i$$

Data were then uploaded to ArcGIS Pro Desktop which uses GIS software to create maps. ArcGIS Pro was selected for this study because of its advanced statistical tools, user-friendly interface with US Census Data, and capability for handling large-scale data sets. For the present study, maps were created using the US Census Bureau TIGER/Line Shapefiles. Shapefiles represent geographic features (i.e., neighborhoods) and contain a geographic identifier which can be linked to neighborhood demographic data. Neighborhood demographics including median household income, and the racial/ethnic makeup of neighborhoods were linked to the Shapefiles to create graduated colors across Knox County visually representing the income and racial/ethnic variables of neighborhoods. Campus locations were then added as an additional layer to the maps. Here, teacher data representing the percentage of teachers with at least three years of experience were also uploaded with campus locations. Hotspot analysis was performed with ArcGIS Pro to identify any statistically significant hotspots (a clustering of schools with high percentages of experienced teachers) or cold spots (a clustering of schools with a low percentage of experienced teachers).

Findings

Using a moderated regression analysis, this study sought to investigate the relationship between student demographics and student achievement moderated by the experience of the teachers on a campus. To answer research question one, Is the relationship between student demographics and student achievement moderated by teacher experience? The regression analysis revealed that the percentage of students of color on a campus (B = -0.0267, p = 0.055) had a marginally significant negative effect on student achievement but was not statistically significant. The percentage of students receiving free or reduced lunch on a campus (B = 0.0623, p = 0.249) was not a statistically significant predictor of student achievement scores. The interaction between the percentage of students of color on a campus and the percentage of teachers with three or more years of experience was significant (B = 0.0004, p <0.05), indicating that the achievement scores of students of color increased as the percentage of teachers with three or more years of experience increased. See Table 1 for the summary of the regression analysis.

Research question two asked, how are experienced teachers dispersed across neighborhoods in Knox County Schools? To answer this question, teacher experience data were collected from TnDOE, and the race/ethnicity demographic data and median household income data were collected from the US Census Data site. All were uploaded to ArcGIS Pro Desktop for spatial analysis. Figure 3 displays the percentage of households of color across census tracts with the darker purple representing a higher percentage and the lighter purple to white representing a lower percentage. The map shows that the history of redlining still persists today, with most families of color living near the city center, while White families mostly live nearer to the county's edge in the more suburban spaces of Knoxville. The points on the map indicate school sites and the color of each point represents the percentage of teachers on the campus with three or more years of experience. The yellow symbolizes a lower percentage of experienced teachers while the movement toward orange and then dark red symbolizes the percentage of experienced teachers increasing. Yellow dots are primarily located in census tracts with higher percentages of households of color, and no yellow dots are found in census tracts containing mostly White households. Red dots are mostly found in census tracts with majority White households.

Figure 3

Dispersion of Experienced Teachers Across Census Tracts by Percentage of Households of Color

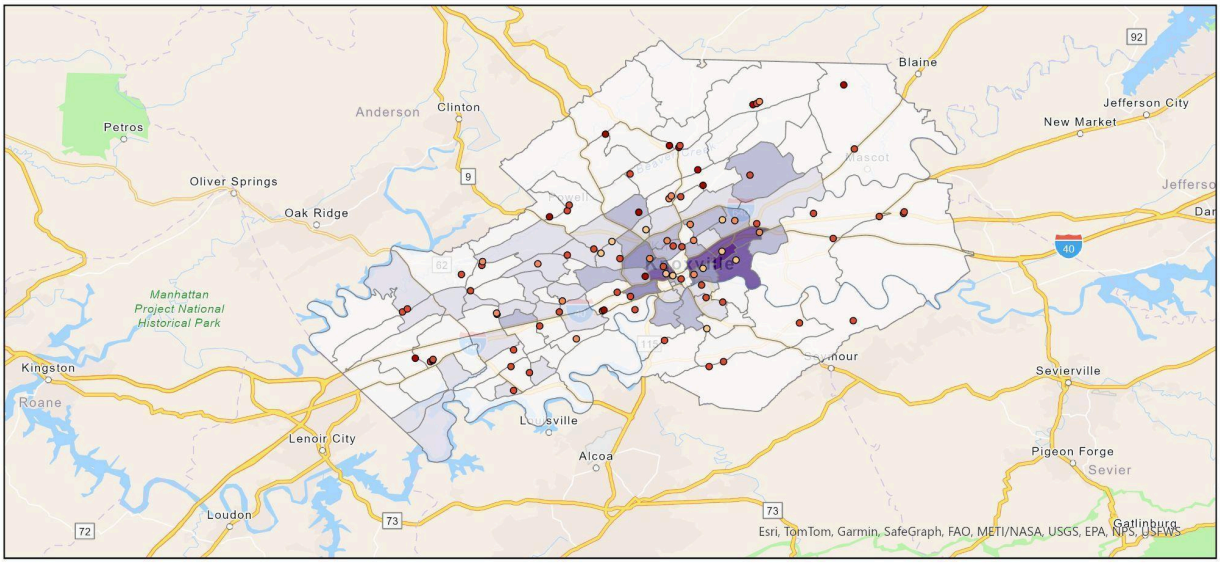
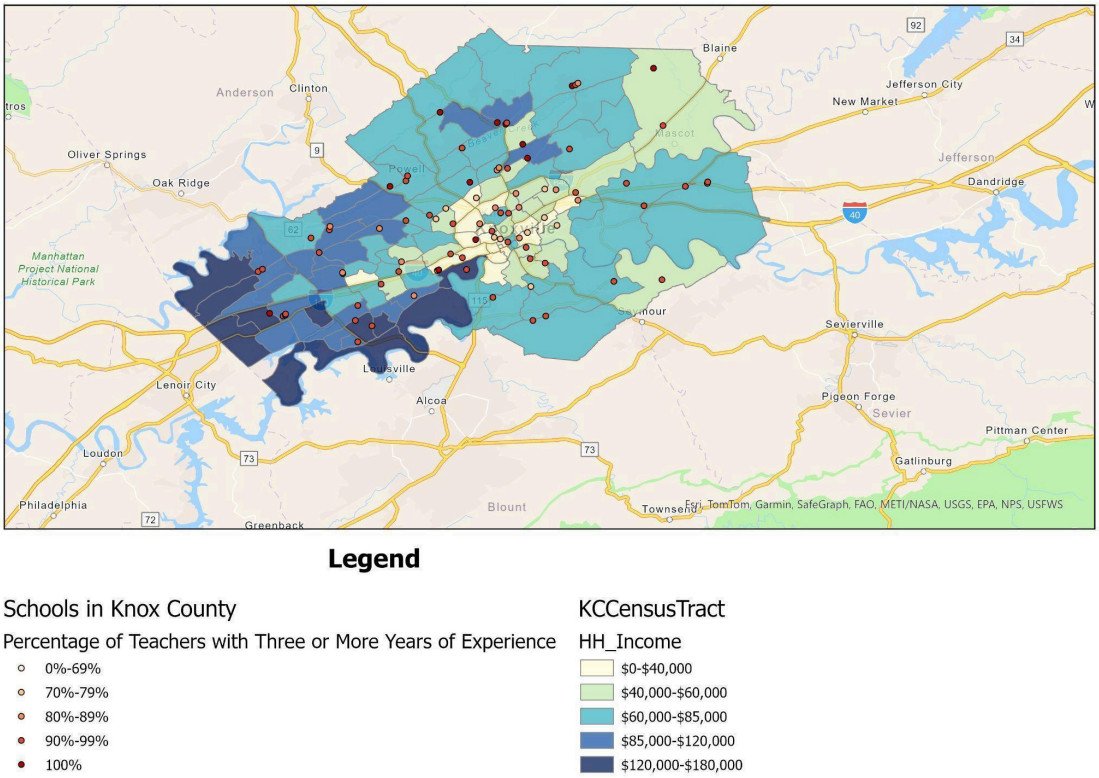


Figure 4 displays the median household income of each census tract with the light yellow representing households that earn less than $40,000 per year and the darkest blue representing households that earn between $120,000 and $180,000 per year. This map illustrates the lingering economic segregation with households earning the least being centralized in the city. It also shows the concentration of wealth in the western parts of the city/county hearkening back to the redlining map of 1939. Here there is also evidence that schools with experienced teachers are most likely to be located in the wealthiest census tracts while more inexperienced teachers are located in census tracts with households earning less.

Figure 4

Dispersion of Experienced Teachers Across Census Tracts by Median Household Income



Following initial spatialization of demographics and teacher experience, the hotspot analysis in ArcGIS Pro was employed. Figures 5 and 6 demonstrate that there were statistically significant cold spots in the city's neighborhoods with the highest percentage of households of color and the highest percentage of households with lower median incomes (with ≥ 95% confidence). Statistically significant hotspots (with ≥ 90% confidence) were located in neighborhoods with the highest percentage of White students and median household incomes of at least $60,000.

Figure 5

Hotspot Analysis of Experienced Teachers Across Census Tracts by Percentage of Households of Color

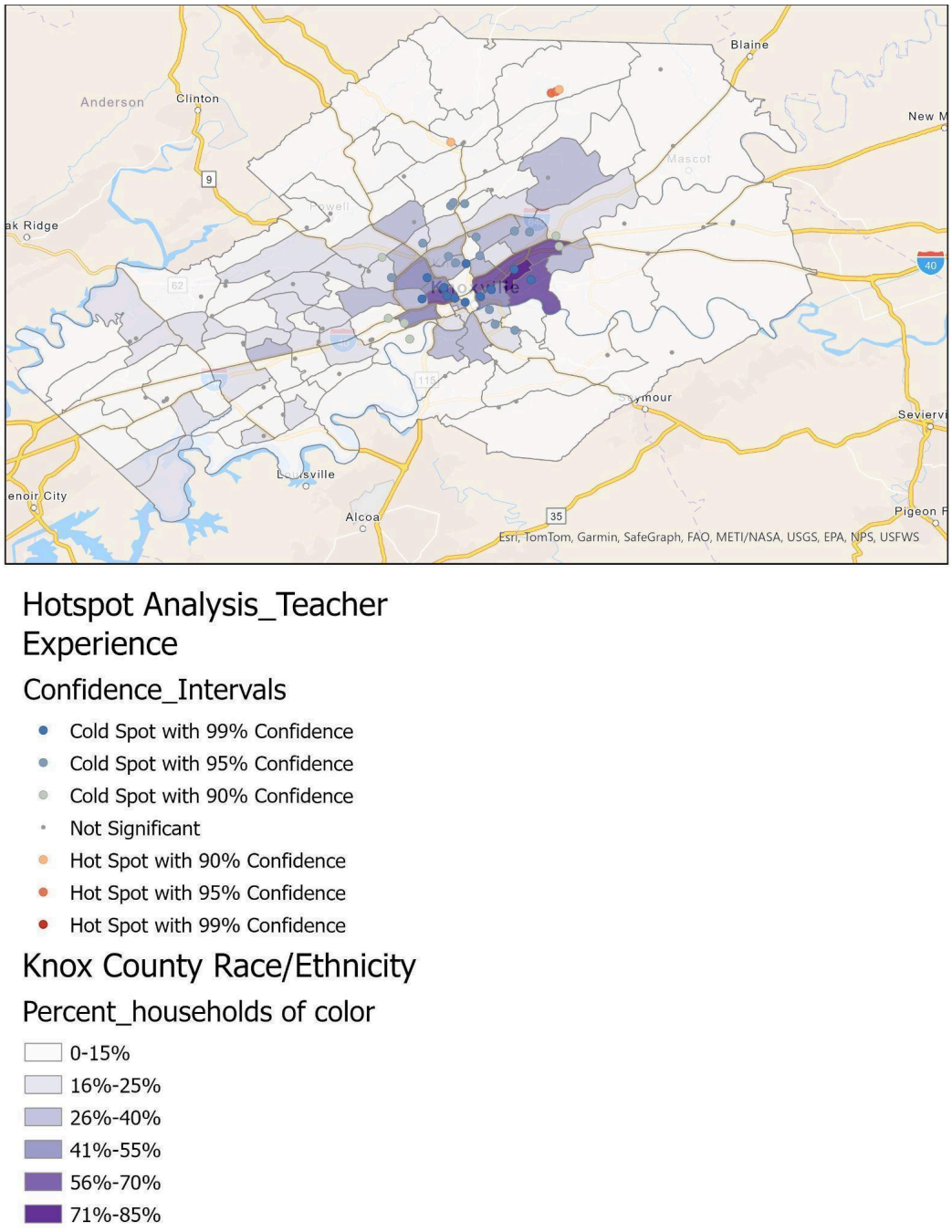
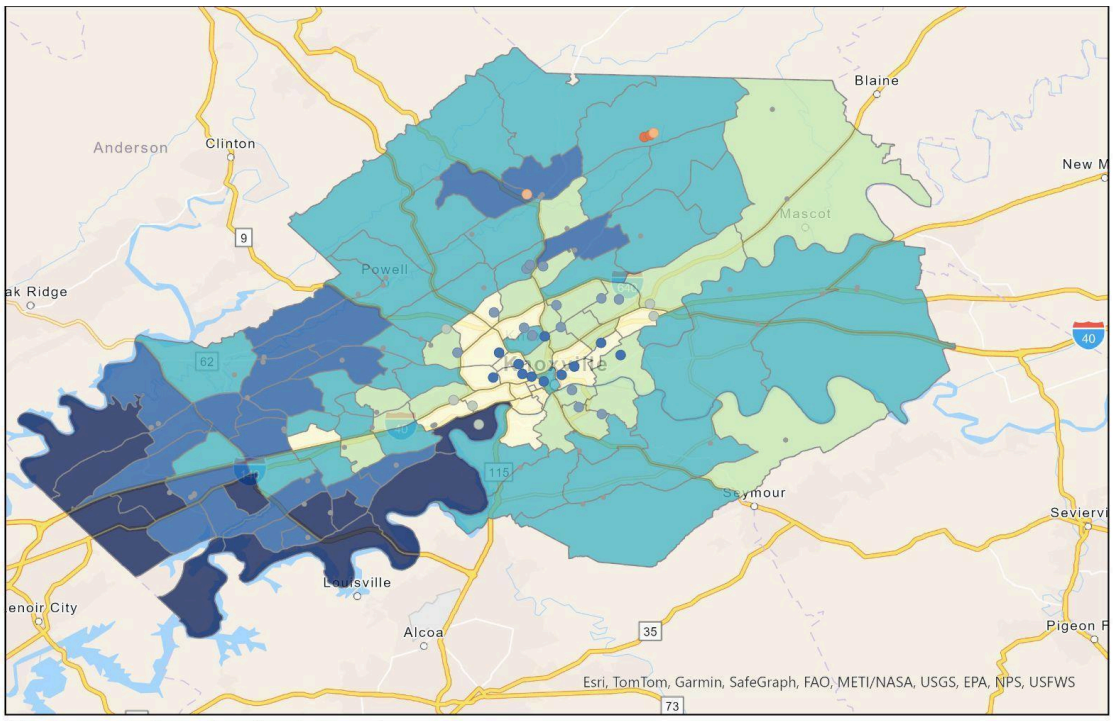


Figure 6

Hotspot analysis of Experienced Teachers Across Census Tracts by Median Household Income



Research question three, how does this dispersion expand or limit access to those students who may benefit most from having a teacher with more experience? will be explored in the discussion section.

Discussion

This study utilized a regression analysis and critical spatialization to map the geographic distribution of experienced teachers across Knoxville. Previous research has demonstrated that a teacher's years of experience is a statistically significant predictor of student achievement and success (Aaronson et al., 2007; Blizard, 2021). However, given the current realities of income segregation across school districts (Owens, 2018), students from historically marginalized neighborhoods are the least likely to have access to teachers with more years of experience (Haberman, 2005; Hill-Jackson et al., 2019). The first part of this study, the regression analysis indicated that although only marginally significant, the percentage of students of color on a campus did result in lower overall composite scores on the TVAAS assessment, while the percentage of students receiving free or reduced lunch was not a statistically significant predictor of student achievement at a campus. Despite these not being statistically significant, the analysis did reveal that teacher experience was a statistically significant moderating variable for students of color and their achievement scores on TVAAS. Teacher experience was not a statistically significant moderator for students who receive free or reduced lunch.

In considering research question three, How does this dispersion expand or limit access to those students who may benefit most from having a teacher with more experience? the regression analysis highlights that students of color in Knoxville County Schools (KCS) benefit most from having experienced teachers, thus the critical race spatial analysis (CRSA) sought to explore how experienced teachers were dispersed across the district and how this dispersion contributes to equitable access. CRSA necessitates that those employing GIS in educational research consider the educational inequities documented in previous studies in order to approach mapmaking critically (Solórzano & Vélez, 2016; Soja, 2008; 2010). CRSA recognizes that spaces are created to preserve the color line and maintain invisible borders that privilege some groups over others (Du Bois, 1903; Soja, 2008; 2010).

The CRSA revealed that the students living in the wealthiest neighborhoods and/or those neighborhoods with mostly White households were the most likely to attend a campus with the highest percentage of experienced teachers. The maps for median household income and racial/ethnic makeup of the neighborhood illustrated the continuing segregation in the city. The persistent segregation across KCS suggests that inequitable access is likely for students (see Saparito, 2017). To further investigate this likelihood, hotspot analysis was conducted in ArcGIS Pro. Here, the findings exposed that access to experienced teachers was reserved for students in mostly White, more affluent neighborhoods as indicated by hotspots or schools with high percentages of teachers

with experience. Cold spots were located in neighborhoods with more households of color and households with lower median incomes substantiating the limited access that students of color (who would benefit most) have to experienced teachers. These cold spots represent what Soja (2008) terms sites in need of intervention.

The boundaries of the district are not obfuscated, they are clearly drawn to bisect the Knoxville metropolitan creating areas of access and areas of inequity. To intervene and transform those areas wherein experienced teachers are needed, it is first important to understand that research demonstrates that teachers who leave are not leaving because of their students (Simon & Johnson, 2015). Teachers who leave overwhelmingly point to school leadership, relationships with other teachers, and their autonomy to choose instructional practices that are most beneficial for their students (Marinell & Coca, 2013; McKinney et al., 2024; Simon & Johnson, 2015). In a review of research, Simon and Johnson (2015) explained that there was little evidence to link teacher attrition and student demographics and instead it was the relationship between teachers and the social aspects (leadership, collegiality, and autonomy) that were most predictive of their willingness to persist. Similarly, McKinney and colleagues (2024) attributed teacher retention to the individual teacher's characteristics versus the environment. Using Haberman's (2005) Star Teacher criterion, the researchers found that those teachers who opted to select and remain in urban, high poverty schools do so because they are seeking out an environment that fits their professional aspirations and commitments (McKinney et al., 2024). These star teachers are more likely to have staying power in a school because of their own intrinsic motivation to help students achieve.

This is important because while the campuses across KCS cannot change the demographics of the students who are in attendance, they have tremendous ability to tend to the school environment and those elements that teachers have pointed to as being the most important to them. School leaders can influence turnover in their schools by exerting strong leadership and encouraging collegiality (Marinell & Coca, 2013). Likewise, school and district leaders would do well to provide teachers across the district, and namely in those campus cold spots, the professional control to make curricular decisions for their students as well as to participate in district and campus policy decisions (Marinell & Coca, 2013; Simon & Johnson, 2015). Teachers have been shown to return to the same school when they are treated as specialists in their respective roles (Bastian et al., 2023). In a study by Bastian et al. (2023), the researchers found that elementary schools that promoted subject-area specialization contributed to teachers' job satisfaction and self-efficacy. This was particularly evident in urban schools. Along with the retention efforts listed above, recruitment of high-quality teachers to historically marginalized and minoritized neighborhoods

should be prioritized. District leaders responsible for hiring teachers should utilize Haberman's (2005) Star Teacher criteria to identify and seek out those teachers who would have lasting power (McKinney et al., 2024). These recruitment efforts may even begin in teacher preparation programs through a partnership with local urban districts. While there is limited research that links teacher preparation to retention, the role that field placements, clinical experiences, and faculty and district partnership may have on teachers choosing a high-needs setting is evident (McKinney et al., 2024), therefore promoting a stronger connection between teacher preparation program and local schools is needed.

Future Research and Conclusion

While there are prior studies that help to identify the potential contributing factors that may lead to a teacher to stay (or leave) a school, future studies should continue to account for the role of administrators and teacher agency as potential moderators of student success. Similarly, because teacher experience was not a statistically significant moderator for students who receive free or reduced lunch, research exploring potential unmeasured factors such as school funding is needed. During the timeline of the current study, many schools were receiving Elementary and Secondary School Emergency Relief (ESSER) Funds to subvert the impacts of COVID-19 mostly supporting district schools with the most students receiving free and reduced lunch. These funds expired in fall 2024, thus an updated exploration will be needed to address the potential impacts of reduced funding.

While the current study highlights the inequitable distribution of experienced teachers across Knoxville, there is great promise in the role that experienced teachers play in the achievement of students of color. Furthermore, the function of school leadership has great potential to increase the number of experienced teachers in the district's schools with high percentages of students of color and/or students who receive free or reduced lunch. By visualizing those places in need of intervention and distinguishing the contributing factors for student success, this study can serve as a first step in addressing the inequitable access across KCS and can be used as a blueprint for other large, urban school districts as they seek to ensure that student receive equitable access to high quality teachers regardless of the neighborhood in which they live.

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Tables

Table 1

Summary of regression analysis coefficients (n = 85)

Variable	*B*	S.E.	t-value	P > |t|	95% CI [LL, UL]
Students of color	-0.0267	0.0137	-1.95	0.055	[-0.0539, 0.0005]
Socioeconomic Status	0.0623	0.0536	1.16	0.249	[-0.0445, 0.1690]
Teacher Experience	0.0188	0.0257	0.73	0.467	[-0.0324, 0.0701]
Students of color X teacher experience	0.0004	0.0002	2.12	0.037	[0.0000, 0.0007]
Socioeconomic status X teacher experience	-0.00095	0.0007	-1.44	0.154	[-0.0023, 0.0004]

Figures

Figure 1

Knoxville redlining map from 1939

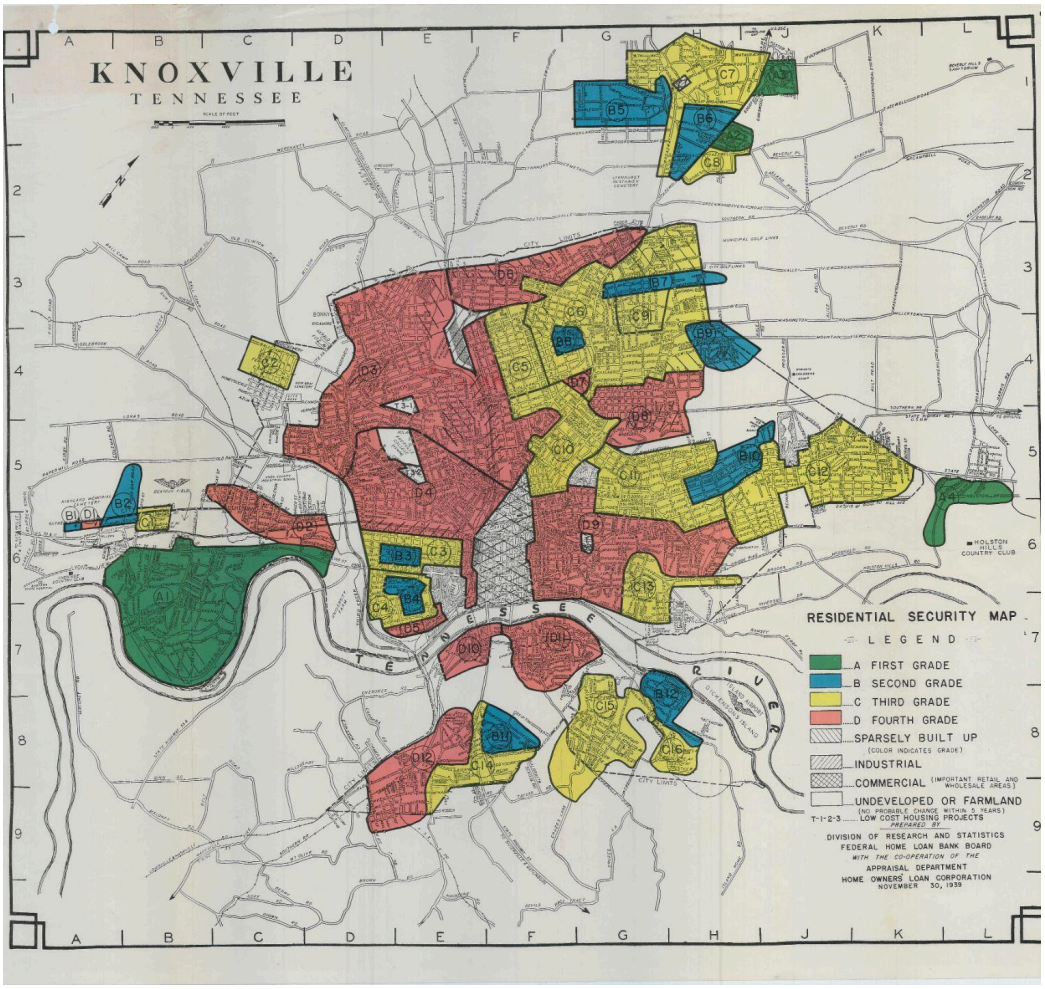


Figure 2

Opportunity Atlas map showing present-day Knoxville

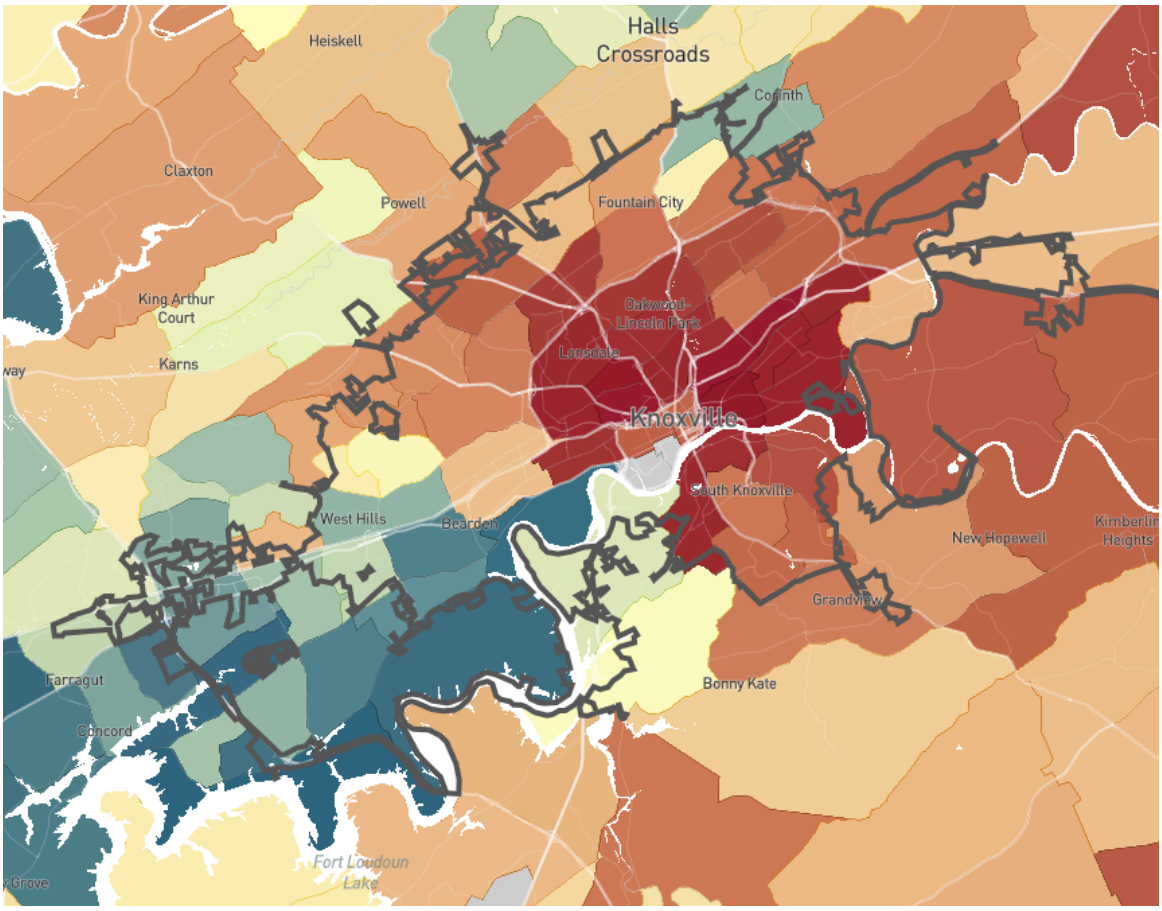
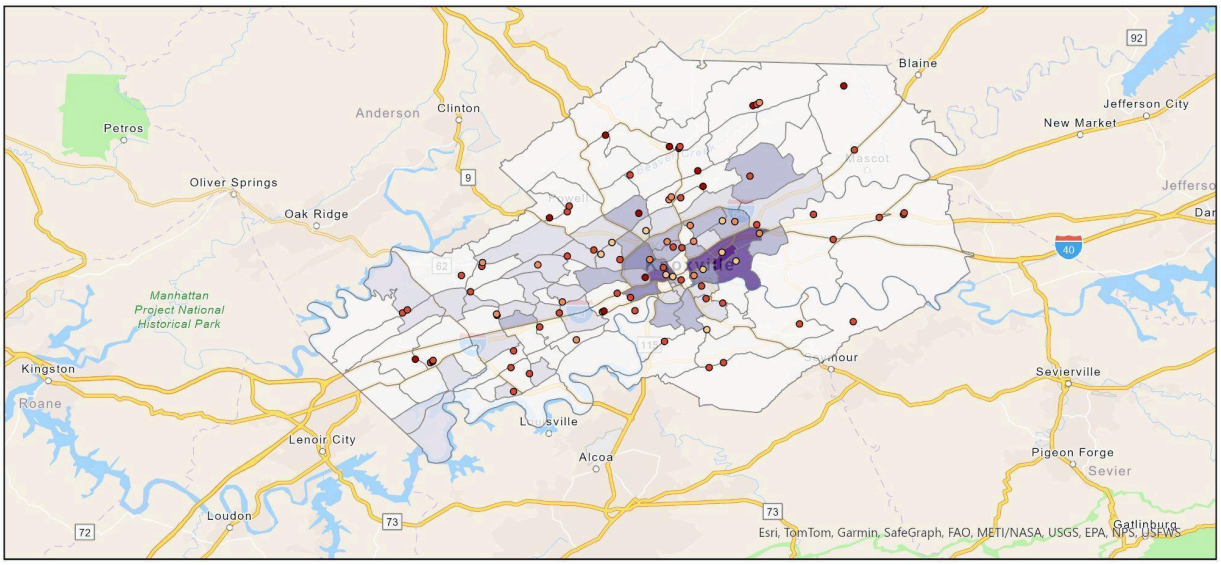


Figure 3

Dispersion of Experienced Teachers Across Census Tracts by Percentage of Households of Color



Legend

Schools in Knox County

Percentage of Teachers with Three or More Years of Experience

- 0%-69%
- 70%-79%
- 80%-89%
- 90%-99%
- 100%

Knox County Race/ Ethnicity

Percent_BIPOC

- 0-15%
- 16%-25%
- 26%-40%
- 41%-55%
- 56%-70%
- 71%-85%

Figure 4

Dispersion of Experienced Teachers Across Census Tracts by Median Household Income

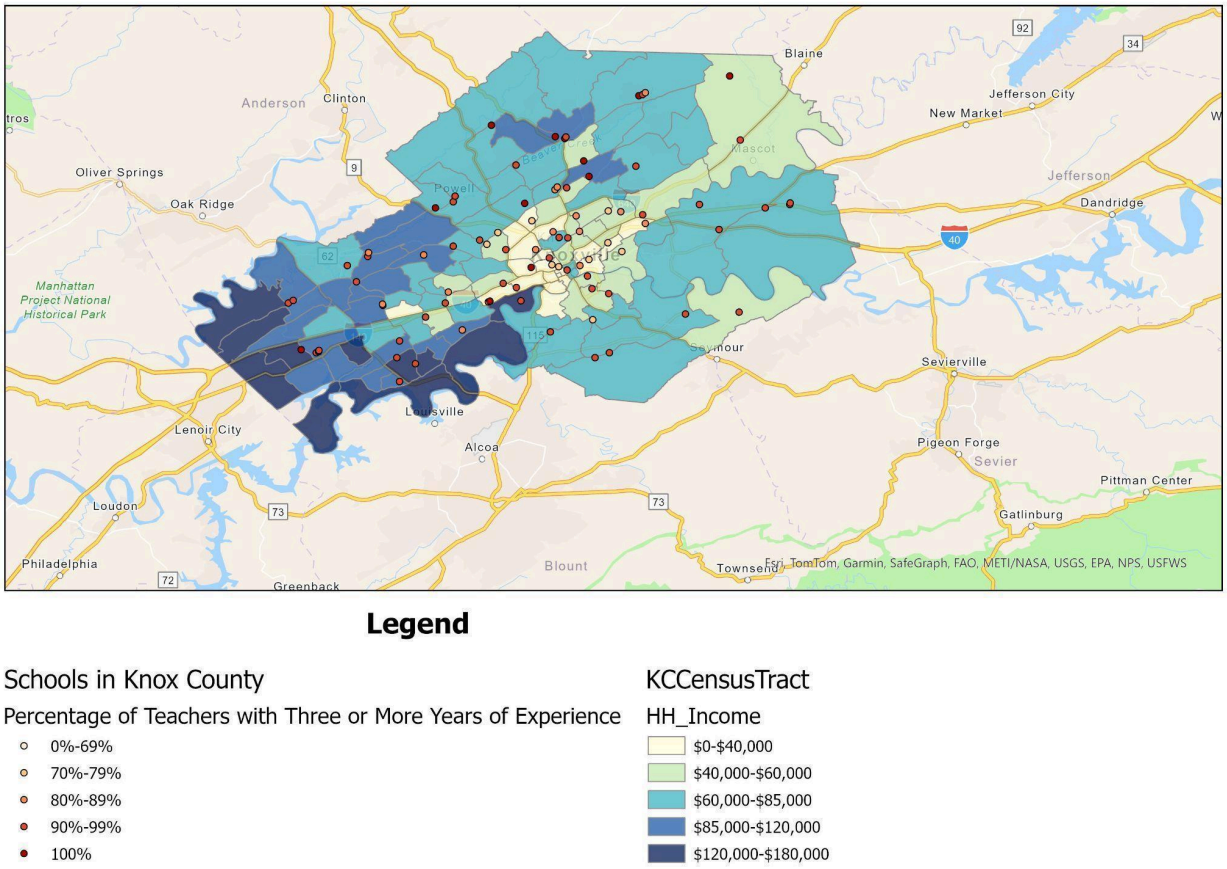


Figure 5

Hotspot Analysis of Experienced Teachers Across Census Tracts by Percentage of Households of Color

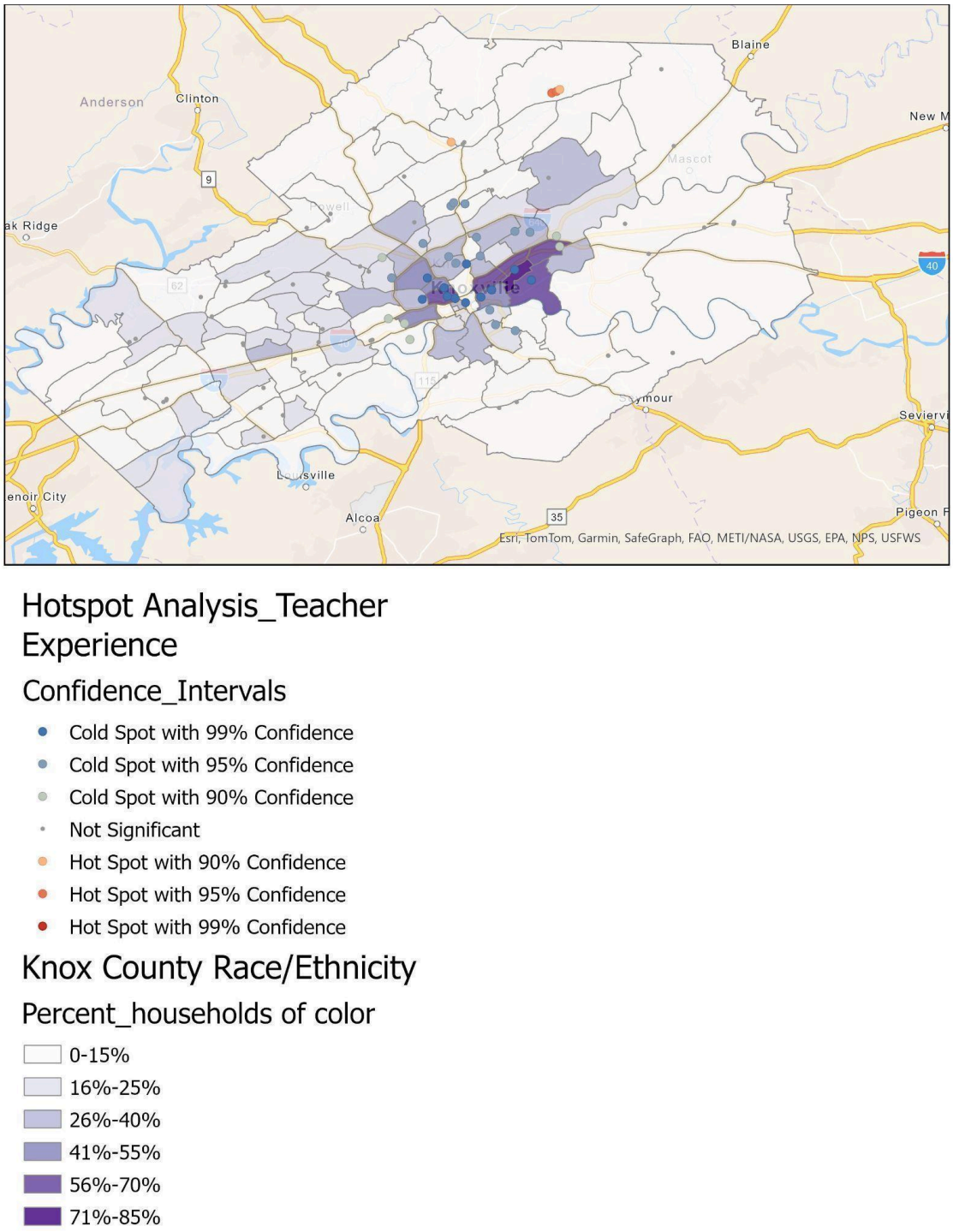
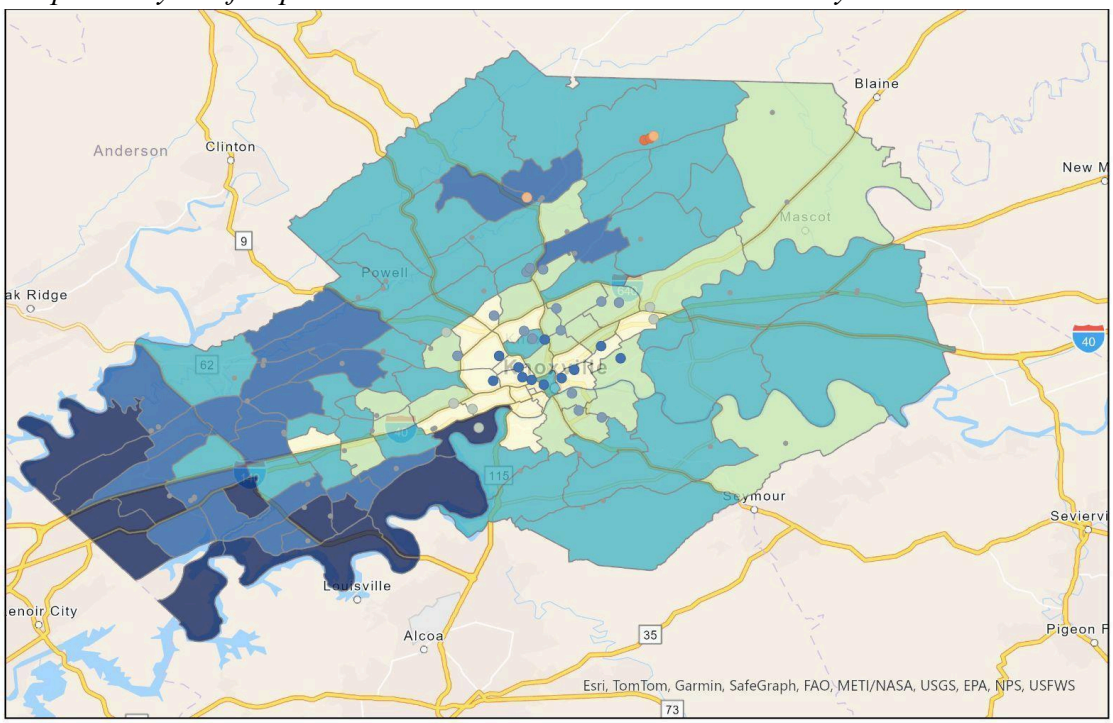


Figure 6

Hotspot analysis of Experienced Teachers Across Census Tracts by Median Household Income



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