UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

AN EXAMINATION OF INTRADISTRICT RESOURCE EQUITY AMONG URBAN OKLAHOMA HIGH SCHOOLS

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

By

Rex Wall
Norman, Oklahoma
2024

AN EXAMINATION OF INTRADISTRICT RESOURCE EQUITY
AMONG URBAN OKLAHOMA HIGH SCHOOLS

A DISSERTATION APPROVED FOR THE DEPARTMENT OF EDUCATIONAL
LEADERSHIP AND POLICY STUDIES

BY THE COMMITTEE CONSISTING OF

Dr. Jeffrey Maiden, Chair

Dr. Gregg Garn

Dr. Howard Michael Crowson

Dr. Beverly Edwards

Acknowledgements

I dedicate this dissertation first and foremost to my wonderful wife, Tomomi, without whom nothing is possible, and my beautiful daughter, Meika, whose presence kept me focused and determined to finish this work. Thank you for your support and tolerating my frequent absences during this journey. None of my past, present, or future educational endeavors would have been possible without my parents, Fred and Claudia. While they are no longer with me physically, their spirit endures in everything I accomplish. Their constant and consistent belief in education as a means to transcend our meager beginnings inspired me to pursue my dreams without succumbing to adversity. I love you all, and my debt of gratitude for your support and encouragement can never be repaid.

This journey would not have been possible without the invaluable support of multiple people. My heartfelt thanks to my chair, Dr. Jeffrey Maiden, who made this work possible. The word 'help' falls short in describing the depth of Dr. Maiden's support, insightful input, clear direction, and when needed, honest and constructive criticisms; thank you, Dr. Maiden. I would also like to thank my other committee members, Drs. Garn, Crowson, and Edwards. Your encouragement, validation, and expertise were instrumental to my success, thank you.

Finally, I would like to acknowledge and extend my deepest appreciation to the University of Oklahoma for allowing me the opportunity to pursue my dream. The child I once was never thought it would be possible to be who I have become today.

Abstract

The purpose of this quantitative study was to inform local practices in the state of Oklahoma regarding the equitable allocation of resources within school districts by examining the relationship between student per-pupil expenditures at high schools located in an urban district and student outcomes. Significant efforts, both legal and academic, have been disbursed on ensuring school districts receive adequate funding from the State; however, limited examination has been performed – both nationally and within the state of Oklahoma - regarding how districts distribute these resources to their constituent schools once the funds are received from the State.

This study presented evidence that inadequately resourced schools, especially those serving higher populations of students with specialized needs such as special education students, children from low socio-economic backgrounds, English learners, and minorities, produce inequitable student outcomes. The focus of the study on urban high schools ensured a diverse sample of students from these high-need backgrounds, yielding results that are more broadly applicable in less diverse school districts than the reverse scenario. This quantitative analysis examined the variance between per-pupil expenditures, teachers and staff quality, and student outcomes across the high schools. This study contributes to the existing body of literature regarding intradistrict resource equity and offers valuable insights for enhancing educational practices within Oklahoma by identifying and closing resource equity gaps within school districts.

Keywords*: equity, school funding, intradistrict, per-pupil expenditures, school district resource allocation, equity audit, Oklahoma*

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Chapter 1 Introduction

Introduction

From the Civil Rights Era to seminal court cases such as *Brown v. Board of Education* (1954), equity in education for all students has become a central concern throughout the modern history of elementary and secondary education in the United States. In his inaugural address in January 2013, former President Obama said, "We are true to our creed when a little girl born into the bleakest poverty knows that she has the same chance to succeed as anybody else." As Webb (2017) aptly noted, "It is a common refrain in American education that the quality of a student's education 'should not depend on his or her zip code" (p. 2170). Authors like Clark McKown (2013) have stressed the importance of education for nations, stating, "Furthermore, the health of any democratic society is predicated on the ability of its population to make informed choices at the ballot box. When large sections of the population are inadequately educated, democracy's health is at risk" (p. 1120).

Prior to 1965, states and local governments were solely responsible for educating children and providing funding for that education; however, as part of the Civil Rights Movement and President Johnson's War on Poverty, the Elementary and Secondary Education Act (ESEA) was signed into law marking a pivotal shift by allocating federal funding for schools with high concentrations of poverty. As is often the case, federal oversight follows federal funds and receipt of federally allocated funds continues to be used to leverage change, an area where earlier the federal government had little to no influence before the introduction of the law. However, despite this national focus on educational equity, students of color and/or low socio-economic students continue to attend under-resourced schools and struggle to meet the academic

standards set by states, often unable to compete academically with their more resourced peers in the same school district (Darden & Cavendish, 2011).

Equity is the standard, unifying principle behind these statements and sentiments. To successfully meet the ethical mandate of providing an effective education to all children, school districts and their constituent schools must first receive access to sufficient quality and quantity of resources. This work focuses primarily on examining intradistrict (between schools within the same district) financial resource equity in order to assess whether school districts, as the recipients of a significant amount of state and local funds, are sufficiently acting in the interests of their wider community by ensuring equitable access to these resources for all schools and all students or not.

A Case for Equity

Writers such as Webb (2017) explore the concept of equitable resourcing of schools from the perspective of case law and the practice of jurisprudence. Indeed, much of the current impetus for change within states and local school districts stems from the external motivator of litigation. A well-documented disparity in interdistrict funding has created significant inequities in schools serving higher populations of students from poverty and/or significant percentages of students of color (Berne & Stiefel, 1984; Heise, 1998; Henry et al., 2010). School districts primarily depend upon local property taxes for the majority of their funding to schools in their communities. States attempt, to a greater or lesser extent and with varying degrees of efficacy, to equalize funding disparities between greater and lesser-resourced districts through state or supplemental aid systems (Owens & Maiden, 1999; Miles et al., 2003; McKown, 2013).

Pivotal to highlighting the issue of intradistrict equity have been landmark court cases such as *Serrano v Priest* (1971), in which the court found that the state school financing system

penalized poorer communities and violated the equal protection clause of the Fourteenth Amendment. Similarly, in *Abbott v. Burke* (1990) also, the court found that under-resourced, urban school districts were unable to properly educate their students due to an unfair and inadequate state financial system. The court famously stated, “The poorer the district and the greater its need, the less the money available, and the worse the education." In *Campaign for Fiscal Equity v. the State of New York* (2003), the court ruled that while the New York Constitution mandated that all children receive the opportunity for a sound basic education, the state's school finance system did not meet the constitutional requirement resulting in the complete revamping of its education finance system. Other similar cases include *Edgewood Independent School District v. Kirby* (1993), *Roosevelt Elementary School District v. Bishop* (1994), and *Gannon v. State* (2017), all of which feature the common element of the judicial system examining state school funding to school districts and finding them insufficient. Court cases such as these primarily address interdistrict resource equity, focusing on how school districts in the same state are funded.

Unlike the issue of interdistrict financial equity, there is not currently a large body of case law regarding intradistrict financial inputs. One case, *Clint Independent School District v. Herrera* (2016), was an attempt by parents to redress grievances with the local school district related to the district’s allocation of financial resources to their child’s school. While the Texas Supreme Court inevitably reviewed and rejected the case for procedural reasons, it presented a novel challenge to how school districts provide funds to schools. The implied assertion of the case is that school districts should provide financial resources equitably and in the same way society expects state funding formulas to provide funds to school districts fairly.

Costly court battles may impose change on a state or school district, but ultimately, they cause a waste of time and money that could have been better spent on finding a solution. High-stakes testing, state-mandated school report cards, and the involvement of federal and state educational authorities in the local education of children should all be impetus enough to ensure that all students have equal opportunity to realize their potential and be adequately prepared for their futures as responsible, contributing citizens. Much as Webb (2017) suggests, a better investment of time and effort would be to proactively address spending priorities, budgets, and allocations of funds before courts and state governments are compelled to intervene.

Problem Statement

A general problem impacting the entire education field is documented resource inequity, resulting in reduced equitable student access to educational resources and opportunities. Webb (2017) notes that "Disparities in per-pupil funding develop at three levels: between states, between districts in the same state (interdistrict), and between schools within the same district (intradistrict)" (p. 2176). While the overarching problem may be an overall disparity in funding to schools with high concentrations of students from families living in poverty and/or large populations of communities of color, the specific problem is the equitable distribution of available (financial) resources to individual schools within districts, known as intradistrict resource equity. Iatarola and Stiefel (2003) found that "While data on resources and performance across districts are generally plentiful, such information within districts is scarce" (p. 69). The courts and states often spend more time and resources examining fiscal equity on a larger scale, but student achievement gaps remain problematic for the underprivileged and students of color (Jimenez-Castellanos, 2010).

Jimenez-Castellanos (2010) draws from multiple studies that demonstrate the impact of resources on student achievement. However, many still adhere to Coleman's (1966) study, which stated that schools only experienced a slight difference in student outcomes (p. 352) attributable to increased financial investment. Resultantly, Jimenez-Castellanos argues that the focus has been more on adequacy rather than equity. Adequacy is an attempt to achieve a minimum threshold of school funding rather than attempting equity through a process that ensures schools receive the resources necessary to achieve established goals. Jimenez-Castellanos' study examined a large, predominantly Hispanic school district in Southern California, while Webb studied schools in a more affluent district in Florida. Interestingly, though both authors were studying essentially different populations of students, they found a relationship between the academic performance of the schools involved and the level of resources provided by their representative school districts, particularly concerning their underprivileged student populations. Money matters, and how much money a school receives, contrary to Coleman's (1966) study findings, influences the outcomes it can generate for its student population.

Purpose

There is no denying that interdistrict fiscal equity and the examination of state adequacy measures are essential; however, the picture is incomplete without a close examination of how well schools are resourced by their district. Fiscal equity is more significant than just the traditional state-to-district funding relationship. This study, using ex-post data, explored the extent to which schools receive financial resources from the school district to determine if schools are resourced equitably, thereby ensuring equitable access to quality education for all students.

Research Questions

This work operates under the assumption that all school districts, in alignment with professional ethics and legal imperatives, strive to provide equal access to education for all students. The observation that under-resourced schools produce underperforming students, provides an excellent reason to study intradistrict equity. The study aims to address the following research questions:

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

RQ2. Is there a significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's State report card results?

Oklahoma Center Stage

The focus of this work will be on examining *intra*district resource equity in the state of Oklahoma. Although much research has been completed to examine *inter*district financial resource equity in the State, very little attention has been given to the distribution of funds by the districts internally. One prolific researcher on this topic is Dr. Jeffrey Maiden, who has written many articles addressing the topic of interdistrict resource equity and educational expenditures within Oklahoma. Maiden's work has examined many related topics, including a comparison of Oklahoma per-pupil funding (Maiden, 1998), the effect of teacher compensation on equitable district resourcing (Maiden & Evans, 2009), adequacy of statewide education finding (Ballard & Maiden, 2018), the effects of the great recession on Oklahoma's education funding (Maiden, 2019), and equity in capital improvement revenue and expenditures (Maiden & Stearns, 2007; Hime & Maiden, 2019; Maiden, Crowson, & Reynolds, 2021). Other researchers, such as

Hancock (2009, 2015), have researched the state's funding formula, while Winton-Glisson (2006) examined the funding decision-making processes in the state legislature regarding education funding. Existing research on school finance in Oklahoma appears to dwell quite frequently on how districts receive funds from the State, but such interest has traditionally stopped once the funds reach school districts. The field will benefit from examining how districts distribute the funds they receive and help provide a more holistic picture of school finance in Oklahoma.

Significance of the Study

If the purpose of education is to advance student achievement and produce an informed electorate, a closer examination of *in*stitutional resource equity must be done to achieve this goal. Strict examinations of funding equity between school districts may mask or fail to adequately show funding inequities inside school districts. The research conducted through this study will produce a greater understanding of *intra*district resource inequities within Oklahoma school districts, which will benefit districts in the state and, ultimately, local schools and the children they serve. There are sufficient data sources from the Oklahoma State Department of Education to examine this issue; however, insufficient research has been conducted in this regard. This study will produce additional information to expand the existing knowledge base and inform local practices concerning school resource equity in Oklahoma school districts, fostering a more equitable distribution of educational resources for all students.

Limitations and Delimitations of the Study

Several delimitations affect the organization and management of this study. The first delimitation is that this study will not directly relate to the concept of adequacy. While adequacy is essential, the primary concern of this paper is to examine school funding levels within the

same school district. A second delimitation of this study is linked with the geographical constraint of this study as it intends to examine and potentially influence professional practices only within Oklahoma, and data from other states will not be collected. A third delimitation is that this study will only examine financial data for a single, large, urban, traditional brick-and-mortar school district. Oklahoma has many rural school districts that often do not include multiple elementary, middle, or high schools. Financial investiture decisions in smaller districts are generally not as complex as in larger districts and are irrelevant to this study. In addition, the state has charter (both physical and virtual) and private schools. These educational entities operate under different guidelines, are not required to report the same data, and do not have access to the same funding sources, which would influence data collection and results. An examination of intradistrict equity should be completed on a like-versus-like basis as much as possible. A final significant delimiting factor for this study is that the study examines financial data for one fiscal year only; the most recent fiscal years, 2021 and 2022, were heavily influenced by the COVID-19 pandemic, which impacted school finances. For this reason, this study will only examine the fiscal year 2019 data derived from the 2018 to 2019 school year to avoid skewed results due to pandemic-linked funding anomalies.

Limiting factors for this study include the availability of non-allocated funding sources, such as Parent-Teacher organizations, fundraising, and donations; this data is generally underreported or inconsistently recorded in comparison to state and local funds. Another limitation involves sources of data. Personnel-related data will be obtained from the participating school district while student demographic and financial data will be obtained from the Oklahoma State Department of Education's Oklahoma Cost Accounting System.

Definitions of Terms

The following terms are used throughout this work; definitions are provided to aid the readers in contextualizing the use of these words.

Equity: The Merriam-Webster Dictionary (2020) defines "equity" as "justice according to natural law or right, specifically: freedom from bias or favoritism."

Interdistrict: The term "interdistrict" refers to interactions or comparisons between school districts, particularly concerning funding principles.

Intradistrict: The term "intradistrict" will be used throughout this work to discuss the allocation of funds amongst schools within the same school district.

Assumptions

This study operates under several assumptions. The first assumption is that school districts are interested in the concept of educational equity and make reasonable effort into ensuring that schools receive adequate funding determined by district leadership as necessary to pursue this goal. The second assumption is that the financial data retrieved from State and Federal sources will be relatively accurate and error-free. The third assumption is that any reported variance in data is due to external or internal factors unassociated with the scope of this study.

Research Methodology Overview

The primary vehicle for this study was student demographics, student performance metrics, general school staffing information, and school finance data available to the public from the Oklahoma State Department of Education. Under the Every Student Succeeds Act, federal law requires districts to report and states to collect financial data, calculated to the cents per dollar, for all funding sources that benefit schools. Comparative poverty data, also available

through the Oklahoma State Department of Education, were collected. This study intended to determine at what level schools with higher populations of students with evidenced need were financially resourced by their school districts compared to other schools in the same district. The study used quantitative methods to evaluate the collected data and draw conclusions.

Summary

The concept of educational equity is an ongoing concern in school districts across the United States. Financial resource equity is a critical facet of the overall effort to ensure children receive the benefit of a quality education. While a robust pool of research exists on interdistrict resource equity focusing on how states allocate funds to school districts, research on intradistrict resource equity is lacking, particularly for Oklahoma. This work will examine how funds are distributed to school sites in one of Oklahoma's largest urban school districts and examine if the funds are allocated equitably. The results of this work will provide an opportunity for discussion on school funding practices of school districts and inform local practice in Oklahoma.

This work is comprised of four additional chapters. Chapter 2 includes a review of the scholarly literature related to equity and school finance, while Chapter 3 presents the design and data analysis used to answer the research questions. The results of the analysis are included in Chapter 4, while Chapter 5 includes the overarching conclusions of the study.

Chapter 2 Literature Review

Introduction

The equitable distribution of resources in the context of school funding represents a foundational pillar in the pursuit of educational justice and excellence (Webb, 2017). Chapter 2 presents a comprehensive exploration of the existing body of research, policies, and practices surrounding the allocation of state and local funds to schools within school districts. In the quest to address disparities in educational opportunities, understanding the nuances of resource allocation is paramount (Berne and Stiefel, 1984, 1999). This chapter offers a critical synthesis of the relevant literature, shedding light on the historical underpinnings, theoretical frameworks, empirical findings, and policy implications that inform the complex landscape of resource equity within educational systems. By examining seminal studies, policy documents, and theoretical perspectives, a theoretical and empirical foundation for this study is established while uncovering various aspects of resource allocation inequities that persist in our educational landscape. The purpose of this study is to address the research questions related to intradistrict equity:

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

RQ2. Is there a significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's State report card?

Examining existing literature on related subjects is essential to completely understand the nuances of intradistrict resource equity. First, it is essential to recognize the importance of resources for student outcomes. This discussion will be followed by an exploration of the historical foundations of resource equity discussions and the applicable policy framework for this

topic. The historical discussion will be followed by an examination of the three major types of equity: horizontal equity, vertical equity, and equity of opportunity. Finally, this chapter will present literature to support the scope of this study, with a focus on weighted student funding, intradistrict resource allocation, and the specific challenges faced by urban school districts. The discussion begins with the influence resources have on student achievement.

The Influence of Resources on Student Achievement

For this discussion, the word "resource" will mean finances, as this conceptual item accounts for the most significant potential impact on student outcomes in and out of school (Heise, 1998; Nyhan & Alkadry, 1999). Schools benefit from financial resources through district allocation processes in addition to potential federal grant resources and other local sources of revenue. However, the effective distribution of available resources impacts the quality of education available to children. Henry et al. (2010) found that regardless of additional funds, poorer schools benefited from financial resources at a lesser rate than more affluent schools. Their study examined the impact of additional state funding provided to high-poverty school districts as an equalization measure to determine the impact additional funds may have on student outcomes and the results indicated a positive net impact on student performance when compared to school districts that do not receive the additional funds. Counter to research showing a link between funding and student achievement, early research by Eric Hanushek (1981) found evidence that there was no definitive relationship between expenditures and student achievement. More recently, however, Hanushek published work that did find a link between economic investment and student outcomes but with a caution that while resources may make a difference, resources must be strategically targeted and effectively implemented (Handel & Hanushek, 2023).

Henry et al., and Greenwald et al. (1996) also noted a positive impact of additional financial resources on student achievement. Greenwald et al. analyzed the data produced by other studies, investigating a range of potential student performance influencers such as per-pupil expenditures, teacher qualifications, teacher experience, teacher salary, class size, and school size. A significant amount of data from more than thirty studies for each influencing factor were compiled and disaggregated by timeframe. The studies were separated by date according to completion before or after 1970. The research results showed a median regression coefficient of .0003 from all studies and .0001 from the studies post-1970 concerning the measurable though modest influence of per-pupil expenditures on student achievement (Greenwald et al., 1996, p. 376).

Pertinent to Oklahoma, Ballard, and Maiden (2018) conducted a study comparing districts with high student achievement levels versus those with lower levels. Their findings indicated that the common factor separating the two categories of school districts was the percentage of funds spent on instructional services. Ballard and Maiden advocated for a more significant percentage of district resources to be dedicated to direct student services rather than to administrative costs. Even a relatively small amount of additional funds spent on instructional services, $51.66 per student in this case, could be a potential predictor for improved student performance.

These studies indicated a strong relationship between student achievement and the funds a school receives per child. Nearly as important as the results themselves, the studies refute previous studies such as the “Coleman Report” (1966), which found no or, at most, a weak relationship between per-pupil expenditures and positive student achievement. Greenwald et al. (1996) argue, “a large, but plausible, value might be a 10% change in PPE (per pupil

expenditures, sic) could result in a change in output of 1 standard deviation over 12 years of schooling, or .083 standard deviations per year" (p.381). Their article claims, "We do not argue that money is everything. How we spend the money and the incentives we create for children and teachers are equally important" (p. 385). More locally relevant, Ballard and Maiden echo this sentiment: "It is up to individuals in leadership across all Oklahoma school districts to adjust how they spend existing money so that students will have adequate access to educational opportunity" (p. 25).

These studies focused on how states and state funds potentially impact student outcomes, which is critical given that state funds are essential and represent most of the funds available to public schools in Oklahoma. However, most school districts also benefit from federal funds. One of the largest sources of federal investment in public education is Title I, Part A (Title I). which includes funds received by school districts that are allocated to schools with high concentrations of students who live in poverty as determined by a consistent measurement, usually through application forms for the free or low-priced federal school meal programs. These funds aim to increase schools' access to additional resources that may help offset the dearth of resources available in students' homes. Matsudaira et al. (2012) examined the potential impact of federal Title I, Part A funds on student achievement. While they found that access to the funds had no appreciable impact on student results, they also found that Title I schools received less state/local funding and had slightly larger class sizes than schools with lower concentrations of students from low socio-economic backgrounds. Notably, this study's limitations were examining class-size reduction effects on student test scores, assuming the funds received by a Title I school were used for that purpose, and using specific subgroups of students to determine influencing outcomes. No variables were considered for student growth, student mobility, or

other possible concerns that would influence outcomes. Despite these limitations, one notable finding was a .25 standard deviation increase in student achievement, which Matsudaira et al. attributed to additional Title I funds. This growth may seem small; however, the study failed to consider a .25 standard deviation increase throughout a child's academic career, which would result in substantially larger gains in achievement (Matsudaira, 2012, p.10), which other studies, such as Greenwald et al., examined. While interesting, Matsudaira et al.'s study is of mixed value due to the intrinsic limitations of the study.

In addition to state and federal resources, access to resources at home serves as another resource category with the potential to impact student achievements. While Matsudaira et al. (2012) were primarily interested in examining funding adequacy, other studies, such as those conducted by Henry et al. (2010), include a variable for parents' education levels. Parent education may be an appropriate data point to examine as it is a potential indicator of parent income levels. Henry et al. found that parents in economically disadvantaged school districts were likelier to have lower education levels than those in more affluent school districts. The study argued that the lower education level of parents negatively impacted student outcomes. The study examined the potential influence of supplemental, per-pupil state funding on student achievement using a method of determining schools as "academically disadvantaged," an index devised for the study which included "teacher stability, experienced teachers, children not living in poverty, and students meeting state proficiency standards" (Henry et al., 2010, p.194). The spending behavior of schools that received the additional funding changed in multiple ways, including a 2.9% reduction in teacher turnover, a 44.33% increase in funds spent on professional development (p.188), and a 34.43% growth in spending on instructional supports (personnel and materials) (p.189). The quantifiable result for student outputs was a 1.27 points reduction in the

achievement gap between academically disadvantaged students and their school peers, which benefited from the additional funds (p.201).

Similar to Henry et al.'s (2010) examination of parent education as a variable in classifying students in a study, Entwisle and Alexander (2019) conducted a study to examine the relationship between parent socioeconomic status and student achievement. Their study examined several variables related to student achievement, such as socioeconomic status, race, parent marital status, and parent education levels. Multivariate tests were conducted that resulted in two significant interactions with, "meal subsidy levels (p=.003) and with parent education levels (p=.06)" (p. 405). After further analysis using sequential MANOVA patterns, the authors were able to eliminate the impact of parent marital or single parent status as a factor, indicating socioeconomic status as the underlying issue at the p=.005 level (p. 406) of significance. The writers emphasized that to achieve a differentiated examination of resources at home and school, it is essential to understand how these intrinsically linked issues interact with one another (p. 408). Henry et al. and Entwisle and Alexander implicitly link resources at home to student outcomes. Parent educational attainment is a deciding factor in determining family income. Both variables assist in determining where families live and which schools their children attend, which contributes to the availability of resources available for a child's academic pursuits.

The preponderance of literature about resource investment in both school and home environments shows that resource availability plays a significant role in student achievement. It is not a far stretch to assert that low socioeconomic families sending underprepared students to under-resourced schools result in poor educational outcomes. As fiscal resources are finite, examining how they are distributed and ensuring children receive the full benefit of the public

investment in their education needed to serve their needs is necessary, prompting the need for a closer examination of the policy framework.

Policy Framework

A deeper examination of fairness and equity in school finances is warranted to understand resource equity comprehensively. Foundational to this discussion of resource equity are the contributions of two contemporaries: John Rawls and J. Stacy Adams who took an interest in the concepts of fairness and equity, respectively, and wrote extensively on the subjects. More contemporary writers have used Rawls' and Adams' collective works as foundation material to encourage equitable distribution of resources to schools nationwide. Additionally, the United States Government has also attempted to promote equity in the distribution of school resources, ensuring that all schools, irrespective of their socioeconomic context, receive the support required to foster student success.

An Exploration of Equity in Early Literature

John Rawls first wrote about justice in the late 1950s, initially through a series of essays that later expanded into lectures before finally being compiled into a book entitled “A Theory of Justice” in 1971, which was later revised in 1999. Rawls’ Theory of Justice (1971) centered on two core principles: equal liberty and equality. Equal liberty simply implies that all citizens have equal rights to fundamental liberties. More importantly, they have the right to personal property, which the government may not infringe upon with the caveat that there is no right to unlimited property. The principle of equality includes the idea that economic principles in society should be aligned to ensure that the least advantaged members of society receive more benefits and should not be barred from social or economic advancement. The principles depended on what Rawls called the “veil of ignorance,” which refers to the absence of bias caused by examining

personal characteristics. Rawls' answer to the average human instinct toward bias was to create a social contract. Identical to Hobbes' proposal (Lloyd & Sreedhar, 2020), the social contract is a set of rational, freely agreed societal norms. By accepting and adhering to the social contract, the veil could be created, but this would necessitate the prohibition of the privileged and talented from pressuring the more vulnerable and disadvantaged members of society, which would invalidate the contract.

J. Stacy Adams first approached the subject of equity in the late 1950s and into the 1960s. Adams and several of his colleagues produced a series of works to identify and inform perceptions of equity and inequity in the workplace. In an article published in 1963, Adams (1963) discussed inputs, outcomes, and inequity in professional environments. Adams' work inferred that for someone to achieve equity, they must first understand the origin of inequity, "In moving toward an understanding of inequity, we increase our knowledge of our most basic productive resource, the human organism" (p. 435). Adams recognized, "In classifying some variables as inputs and others as outcomes, it is not implied that they are independent, except conceptually" (p. 423). Adams argued that imperfectly linked job inputs and outcomes result in a series of "normative expectations" (p. 424) by both the employees and employers. When one or the other party feels these expectations are "not in balance concerning those of others – feelings of inequity result" (p. 424). When inequities are felt, adjustments are made, consciously or unconsciously, by the involved parties to create equity; however, some inequities cannot "be altered easily – sex and ethnicity, for instance. When such inputs are involved, other means of reducing inequity must be adopted" (p. 428). This relates to education as the courts have recognized specific populations of students, by virtue of their condition, experience a break in normative expectations; necessitating societal efforts to address and reduce these inequities.

Contemporary Explorations of Equity

Both Rawls (1971) and Adams (1963) laid the groundwork for justice and equity, but more recent work has been completed to extend their original concepts to the field of education. Just as Adams envisioned the transactional nature of perceived inequities in the workplace and Rawls envisioned the cooperative effort for self-advantage, the inputs and outcomes described by them equally apply to education. Berne and Stiefel (1999) discussed how equity applies to education funding. The inputs described by Berne and Stiefel are "labor, equipment, capital—in their dollar or raw unit forms" (p. 11). The writers stated that frequently, more attention is paid to student outcomes such as student achievement. At the same time, equity should also consider student factors such as lifetime accomplishments, earning potential, or health status (p. 12).

Similarly, though not focused directly on resources, Clark McKown (2013) has written numerous articles about student achievement gaps. In his work, he noticed the propensity for specific populations of students to have more significant gaps than others, prompting him to develop a framework, Social Equity Theory (SET), to help schools and districts identify groups of students requiring academic assistance the most, using racial-ethnic grouping indicators associated with the most significant achievement gaps. Social Equity Theory's focus on a specific area of equity in education allows for a more nuanced examination of achievement gaps by studying "direct influences" such as home life, peer interaction, and environment and comparing them to "signal influences" such as social events. McKown found that as children become older, signal influences impact children and the resulting achievement gaps more heavily (McKown, 2013). It is necessary to identify the student populations who are most in need to ensure that resources are equitably distributed.

Berne and Stiefel's (1984) earlier work established the foundation for subsequent discussions on resource equity. They posited that examining school resources is more valuable and appropriate than merely allocating state funds to school districts. Of particular note in this work, but also pertinent to their later collaborations, is the introduction of certain concepts related to horizontal equity, vertical equity, and equity of opportunity. These concepts are defined and discussed by Berne and Stiefel, as well as other authors, and are crucial to examining intradistrict resource equity.

Critical Resource Theory

In contrast to other contemporary writers' discussions of equity, Kaplan and Owings (2023) presented an education-centered interpretation of an existing body of research with their work around Critical Resource Theory (CReT). CReT recognizes that institutions or persons in power will disproportionately benefit from resources by virtue of their primary access to the levers that control who gets what and how much. The intent of CReT is to identify inequities and advocate for changes in public policy that will ensure a more equitable distribution of resources. In their work, Kaplan and Owings noted that while schools with disproportionate numbers of disadvantaged or minority students may receive somewhat more in overall funding, the difference lies in what the resources actually provide. Inequities may persist, even when efforts are made to ensure adequate funding due to the money not being effectively utilized to meet the needs of the student population. The writers state that "Low-income students especially benefit from working closely with well-prepared and experienced professional educators" (Kaplan and Owings, 2023, p 62). Success in equitably distributing resources does not only rest in the amount of money provided but also in the effectiveness of the goods and services purchased with those funds. Critical Resource Theory is especially useful when providing a lens through which to

examine the results of equity audits, allowing policymakers to identify and address systemic imbalances.

In their work, Kaplan and Owings refer to two case studies that found out how taxpayer funds were inequitably distributed to the detriment of children from less affluent households. The first study, “Alpha and Omega” (Owings and Kaplan, 2010) closely examined intradistrict resource equity between the best and worst schools of an urban district, as identified through a perception survey. They found that the Alpha school benefitted from a remarkably larger pool of resources than the Omega school: a higher number of experienced teachers, a lower student-to-teacher ratio, more rigorous and rewarding class offerings, financial resources, and even basic amenities such as air-conditioning. It was unsurprising that with all the additional resources available, the students enrolled at the Alpha school exhibited far superior academic performance and overall educational experiences compared to their peers enrolled at the Omega school. While a CReT lens was not applied to this study performed by Owings and Kaplan, it did serve as the springboard for them to develop CReT as a means to identify resource inequities and inform policy decisions at the state and local levels.

The second case study applied the lens of CReT to a state funding formula. Owings and Kaplan intended to identify state funding practices that resulted in resource inequity between school districts. The study successfully identified state foundation aid disparities between richer and poorer communities and the additional local funds necessary to support schools. The researchers then simulated the conditions necessary for a more equitable distribution of resources to underserved communities. The results proved that a modest adjustment in the state funding formula by a difference of 10% would enable less wealthy communities to better serve their

community members and provide a more equitable state-funding environment (Kaplan and Owings, 2023, p 7).

A more recent study by Duplain, Owings, and Kaplan (2022) involved an intradistrict equity audit of one mid-Atlantic school using CReT as the theoretical foundation and evaluative tool. In the study, Duplain et al. utilized publicly available school-level expenditure data and applied the three equity classifications proposed by Skrla, McKenzie, and Scheurich (2009). They also created two per-pupil expenditure weight groups based on the work of Verstegen and Driscoll (2008). The results showed significant inequities in the distribution of resources among schools in the district, implying that schools with less access to available resources struggle to provide high-quality education compared to their better-resourced counterparts.

Approaching resource distribution through the lens of CReT will address inequities inherent in a traditional top-down resource distribution model but this is not a one-time solution to equity, disparities in amounts of funding must be coupled with rigorous monitoring of the quality of the services provided to yield meaningful improvement in student outcomes. While it is heartening that researchers and thinkers are discussing and drawing attention to equity concerns, achieving real change will require a thorough examination of a policy and the implementation of necessary reforms.

The Federal Government Pursues Equity

No discussion of educational resource equity is complete without considering the impact of federal policy, legislation, and funding. A long-lasting component of President Lyndon Johnson's "War on Poverty" was the passage of the Elementary and Secondary Education Act (ESEA), signed into law in April of 1965. The law and appropriated funding were initially intended to take place over five years to provide additional resources to schools as an incentive

to meet the reading needs of poor students who had been largely ignored. Despite its noble intentions, there were implementation issues, and later, additional programs were created to serve other high-need groups of children, such as those who spoke English as a second language or students with disabilities. Since its inception, the law has been periodically reauthorized by Congress and has always included equity measures, such as the addition of women's rights in 1984. In addition, accountability measures, such as the inclusion of required national assessments, were added in 1993. Some additions have been more controversial than others, like evaluating school effectiveness through student academic achievement, which was included in the No Child Left Behind (NCLB) Act of 2001. The ESEA was most recently reauthorized as the Every Student Succeeds Act at the end of 2015, which continued the performance expectations under NCLB but also included support and accountability measures tied to less tangible student outcomes such as health, English language acquisition, and post-secondary opportunities (Jeffrey, 1978; Zascavage, 2010). When we discuss equity in educational resources, we should recognize the different forms of equity exhibited in these legislative frameworks.

Forms of Resource Equity

Recognizing the need to examine equity in resource distribution and impact public policy to ensure less advantaged students have access to at least the same quality of education as their more affluent peers is a laudable goal; however, a common understanding of what equity means must also be addressed. For this discussion on educational resource equity, the primary focus is on three major forms of equity, horizontal equity, vertical equity, and equity of opportunity.

Horizontal Equity

Horizontal equity centers on the principle “that equally situated children should be treated equally” (Berne & Stiefel, 1999, p. 18). The only modification to this equal access is the

consideration of additional costs related to the geographical location of schools or other "environmental" influences (Verstegen, 2013). Horizontal equity was most often used in legal proceedings and court decisions focusing on resulting measures of fiscal adequacy, the attempt to attain equilibrium in the levels of state and district (primarily state) financial inputs to schools. An example of horizontal equity in Oklahoma is how state aid adjustments are represented as an "adjusted valuation" based on a statewide comparison of school district access to ad valorem tax levies (Oklahoma State Department of Education, 2020). The adjusted valuation is a chargeable factor included in the Foundation Aid formula. Schools with access to more local ad valorem tax revenues are "charged," reducing their access to state aid and making more funds available to districts with lesser access to local funds.

Adequacy is often seen in "equalization" measures in which states allocate additional funds to districts whose local tax revenues are below certain thresholds (Berne & Stiefel, 1999; Heise, 1998; Toutkoushian & Michael, 2007). Adequacy may seem simple since it is much easier to calculate the resources available to school districts than to examine the additional costs of educating special education students or English learners. The literature informs us that difficulty arises in applying equity measures across whole groups of students. For equity to be effectively measured, students should be separated into subgroups with like characteristics as was the case in Berne & Stiefel's work (1999) and a statistical method should be applied to control for each group's specific needs (Toutkoushian & Michael, 2007). Horizontal equity is intended to measure how school districts allocate resources to students in similar circumstances in their schools. However, the additional assumption implies that like outcomes result from like inputs. Modern data reporting and availability have grown significantly beyond any former limitations; state and federal educational agencies now require and collect such comprehensive

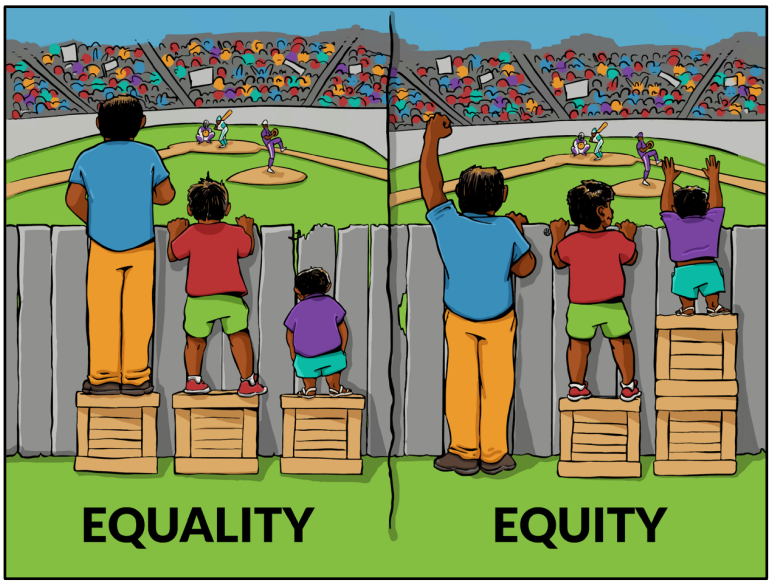
data from schools nationwide, which is readily available on government websites. The ready availability of disaggregated data allows us to transcend the limitations of the whole grouping intrinsic to horizontal equity, paving the way for the next form of equity to be discussed, vertical equity.

Vertical Equity

The concept of equitable distribution of resources encourages identifying and addressing inequities within educational systems. Vertical equity, the examination of inequities specific to particular students or groups of students, is ideally aligned with this goal. The goal of vertical equity is to mitigate potential negative consequences related to inequities. Vertical equity also proposes that individuals in similar situations may exhibit different needs and, therefore, there may be greater or lesser associated costs necessary to address their needs (Berne & Stiefel, 1999; Underwood, 1995; Verstegen, 2013). Early in the pursuit of financial equity for educational institutions, the courts attempted to address inequities by ensuring schools were adequately funded. The resulting case law generally requires states to examine their funding mechanisms and ensure adequate funding of school districts, resulting in the shift of focus away from horizontal equity and toward vertical equity. To achieve vertical equity, the state must provide additional financial support to benefit students who struggle to meet performance expectations due to internal and external inequities (Allbright, 2019; Toutkoushian & Michael, 2007; Underwood, 1995). Figure 1 presents a commonly used image, which helps to visualize the difference between horizontal equity (equality) and vertical equity (equity). For this discussion, the boxes on which the persons are standing symbolize the allocated financial resources for educational support. The baseball game represents the basic educational opportunity offered for their benefit. The child unable to participate due to a dearth of resources is benefitted when

additional resources are allocated to them, resulting in an opportunity to participate. This exemplifies how vertical equity is intended to operate.

Figure 2.1: Equality v. Equity



Note: (Maguire, 2016)

In related work, Whiteman and Maiden (2020) examined the connection between adequacy and vertical equity as it relates to a specific subgroup of students, Native Americans. They found that while state funding remained consistent, federal investments were more erratic, producing negative results in student achievement. They asserted that a significant component of vertical equity is providing specific groups of students with the resources necessary for success. There is more nuance to the subject than just determining the level of funds needed to produce desired results; Whiteman and Maiden stated, “In order to measure fiscal adequacy, scholars must continue to attempt to connect organizational inputs to outputs” (p. 20). Ensuring all schools within a district can adequately provide resources for addressing the needs of enrolled students, regardless of student background, requires a thoughtful approach to resource allocation. Horizontal and vertical equity are ways to ensure students have adequate access to opportunity, which is yet another form of equity.

Problems with vertical equity arise from an innate sense of unfairness experienced by those who experience a reduction in financial resources, prompting additional funds to flow toward identified, needy children. Apportionment of finite resources in the pursuit of equity requires us to take from one group to better serve an identified higher-need group. States like Oklahoma, which pursue some form of vertical equity, often allocate funds on a weighted, per-pupil basis by identifying subpopulations of students (i.e., English learners, children with disabilities, children in poverty, and gifted students) who are most in need of additional resources and assigning a modifying amount in the calculation of state aid. Stakeholders in schools that do not receive additional funding may perceive a disruption in the "normative expectations" described in Adams' discussion of equity, producing the perception of inequity. Allbright et al. (2019) performed extensive fieldwork involving interviews with parents and school staff. They learned that no matter the form of vertical equity pursued (funding or staffing), persons associated with schools experiencing the cuts in redistributing resources felt they were being treated inequitably. The difference between schools in districts where equity measures were pursued without a break in normative expectations and those with higher stakeholder dissatisfaction resulted from district leadership providing "organizational clarity and (the) laser-like focus" (Allbright et al., 2019, p. 191).

Equity of Opportunity

At their core, both horizontal and vertical equity measures are meant to increase educational opportunities for students; however, as Michael Heise (1998) wrote, "the legal operationalization of equity, at least at the public level involving school resources, has proven notoriously complex and difficult" (p. 580). In his writing, Heise recognized that the differences intrinsic to the arguments for horizontal and vertical equity might create tensions because it is

challenging to compute required inputs in a general way to provide equalized, adequate funding as well as meet the varied and specific needs of students in their respective schools. The United States Department of Education (2013) convened the Equity and Excellence Commission, which produced findings similar to Heise's observations. The commission was a bipartisan body, comprising various government and non-governmental stakeholders, and was convened to advise the United States Secretary of Education regarding "disparities in meaningful educational opportunities give rise to the achievement gap, with a focus on finance, and to recommend ways in which federal policies could address such disparities" (p. 3). The commission found the difficulty in calculating individual student needs was substantial enough to generate a recommendation for states to identify and report the resources necessary "to provide a meaningful educational opportunity to all students of every race and income level" (p. 18).

These difficulties would make realizing the tenets of equity impossible without an appropriate solution in education, a component able to bridge the generalized adequacy of horizontal equity with the difficult-to-quantify funding required for specific needs of vertical equity. Equity of opportunity is the linking measure. Knoeppel et al. (2014) state, "Resources fund opportunity; it is the duty of the state to provide a system of education for all children and to fund that system adequately" (p. 828). While court cases may focus on adequacy (horizontal equity) and federal and state laws add weighted funding plans (vertical equity), equity of opportunity is the measured result that determines the effectiveness of funding schools in a given state. Opportunity may best be quantified by student outcomes, academic grades, or their equivalent on state assessments. If outcomes for all students align with expectations, the funding formula may be seen as equitable, whereas if student outcomes are inconsistent with

expectations, the funding formula may require adjustment (Knoeppel et al., 2014; Knoeppel & Rinehart, 2011).

In Oklahoma, this concept is demonstrated by the state funding formula. Horizontal equity is addressed by the increase or decrease in state aid to school districts based on the amount of available local ad valorem funds. Vertical equity is achieved through the addition of a weighted per-pupil calculation. While neither measure leads to equality of opportunity or positive student outcomes, the combination of the two attempts to achieve both adequacy and serve the specific needs of students. Much literature has been written on horizontal equity/adequacy, as it is the overall amount of funds going into the education system. The measures states have implemented to address vertical equity, such as Weighted Student Funding, serve as a model for school districts to potentially provide needed resources to groups of students with the greatest need.

Weighted Student Funding as a Means to Achieve Equity

Horizontal equity addresses issues of adequacy, vertical equity illuminates the specific needs of subpopulations of students, and equity of opportunity stresses the importance of access to services; however, achieving true equity requires further measures. Systems of equity to ensure the neediest children receive access to the same quality of basic education as their more resourced peers correspond to determining how much money is enough. One effective way to ensure districts receive adequate funding sensitive to the particular needs of student populations is through weighted student funding (WSF). Weighted student funding is most often seen in relation to how states distribute common education funding to schools. The distribution is based on several factors, and states assign additional funding multipliers, or weights, to categories of students with the intent to account for additional costs associated with educating such children.

For example, a standard student is represented by a 1 multiplier, while a student from a low socio-economic background may receive a 1.2 multiplier; this results in districts with higher populations of such students receiving the benefit of additional state aid funds (Allbright et al., 2019, Berne & Stiefel, 1999; Toutkoushian & Michael, 2007; Underwood, 1995).

In Oklahoma, state aid student weights are determined by state statute (70 O.S. §18-201.1). Many weights are attributable to state aid, and all are arguably important; however, for this discussion, we will examine student-specific weights: grade level and pupil categories (special education, gifted, bilingual, and economically disadvantaged). The current weights began in the current school year, 2020-2021; while previous weights have been examined for equity, it will take several years before the impact of current weights will be studied.

The grade level weights presented in Oklahoma state law are:

- Half-day early childhood programs .7;
- Full-day early childhood programs 1.3;
- Half-day kindergarten 1.3;
- Full-day kindergarten 1.5;
- First and second grade 1.351;
- Third grade 1.051;
- Fourth through sixth grade 1.0;
- Seventh through twelfth grade 1.2; and,
- Out-of-home placement 1.50.

The pupil category weights in Oklahoma state law are:

- Visual Impairment 3.8;
- Specific Learning Disability .4;
- Deafness or Hearing Impairment 2.9;
- Deaf-Blindness 3.8;
- Intellectual Disability 1.3;
- Emotional Disturbance 2.5;
- Gifted .34;
- Multiple Disabilities 2.4;
- Orthopedic Impairment 1.2;
- Speech or Language Impairment .05;
- Bilingual .25;
- Special Education Summer Program 1.2;
- Economically Disadvantaged .25;

- Optional Extended School Year Program (not currently assigned);
- Autism 2.4;
- Traumatic Brain Injury 2.4; and,
- Other Health Impairment 1.2.

Oklahoma's student weight system accounts for the additional costs associated with providing educational opportunities to students in the associated subpopulations. For example, an economically disadvantaged student carries a .25 weight; this indicates a conclusion by the formula crafters an increased cost of 25% to educate a student of this demographic category. One detracting factor of Oklahoma's system is that while these weights can produce some measure of vertical equity, the law does not begin to reduce school district access to state aid funds until local per-pupil revenue exceeds 150% of the state average. If the reduction point were 100%, school districts that benefit to a lesser degree from local funding sources would benefit more from state funds thereby augmenting their capacity to provide resources to students.

Measures such as WSF applied to the intradistrict funding of schools would result in more significant resource equity at the school level. When the federal Every Student Succeeds Act was signed into law in 2015, it contained provisions for school districts to participate in a trial study to examine school-based WSF. The United States Department of Education (2019) analyzed the trial study using data from the nine participating school districts. The analysis findings indicated, "WSF is a tool that may be used to direct higher levels of funding to schools with greater needs, but its effectiveness in improving the equitable distribution of funds will be influenced by the details of the formula" (p. 67). The formulae used by the participating school districts and their accompanying student categorical weights varied considerably between the districts, which resulted in varying levels of success. The study also found that the inconsistent nature of state-to-district funding outlays played a rather significant role in the districts' ability to distribute funds equitably (p. 69-70). The results of this study highlight the need for states to

meet the requirements of horizontal equity by first ensuring the adequacy of funding to school districts. Equally important is the necessity for school districts to pursue vertical equity by assigning resources to schools based on student needs so schools can produce equity of opportunity measures by leveraging allocated funds effectively to provide all attending students with the support necessary for academic growth. Entities must know when resource outlays no longer align with their equity goals, and equity audits contribute as an effective technique to stay focused.

Aligning Resources and Equity Audits

One of the most impactful ways a school district may positively impact its community is by aligning resources effectively. As noted by Rorrer et al. (2008), "aligning resources is indicative of the will (commitment) of the district to their reforms" (p. 327), for pursuing established goals and advancing vertical equity. School districts nationwide use various means to allocate resources to schools within their communities. Eric Houck (2011) examined several studies focusing on intradistrict resource allocation and found not only similar outcomes to those noted by Miles et al. (2003) and Darden and Cavendish (2011) but also presented more contextual financial data related to how districts resource their schools. Houck noted that since taxation and macro resource accumulation occur at the district level, intradistrict resource allocation analyses allow for a closer examination of relationships between specific student qualifiers (poverty, underrepresented status, or geographic location) and how districts allocate resources to the schools the students attend. Owens and Maiden (1999) demonstrated that district funding to schools significantly impacts intradistrict equity. They revealed that some schools received more than two times the per pupil allocation of funding than other schools in the same

school district. This difference in funding was particularly noticeable for schools serving larger populations of African Americans and free/reduced meal-eligible students.

Instead of using systems similar to WSF, districts most often depend on the staffing costs of schools when determining resource allocation. Miles et al. (2003) discussed the differences between staff-based budgeting and student-based or WSF methodologies. Staff-based budgeting is the concept that districts allow a staffing formula to drive the amount of funds a school receives, resulting in more of a sufficiency model than a needs-based assessment of resource allocation (p. 116). Miles et al. and Darden and Cavendish (2011) pointed to schools that served higher proportions of students from minorities and/or low-socioeconomic backgrounds as also filling teaching vacancies with less experienced, lower-paid teachers. Stiefel et al. (2004) corroborated these findings in their discussion of school funding in the urban communities of New York City, Cleveland, and Columbus. Teacher salaries and student poverty were inextricably linked with ineffective, lower-paid teachers who were found to be mostly assigned to schools serving a higher concentration of students from families who lived in poverty. Criteria were established to provide additional resources, beyond funds for staffing, to schools with higher-than-average populations of inexperienced, lower-paid, and less effective teachers. The additional resources aimed to increase teacher performance and student achievement.

Darden and Cavendish (2011) noted that inequitable distribution of resources to sites within the same district is not necessarily intentional "but may result from a simple lack of awareness and the absence of a strenuous focus on resource equity among policymakers, school administrators, and parents." (p. 62). Darden and Cavendish found the same issue in within-district budgeting as Miles et al. (2003), noting school budgets were primarily focused on averaged staffing costs and the number of teachers while also asserting that "leftover funds

cannot be applied to other resources" (p.64). Whether a district follows a staff-based funding model, focused on an established student-to-teacher ratio rather than a WSF model, or is forced to allocate supplemental resources to schools inefficiently, the result is inequities in resource distribution for higher-poverty schools serving predominantly urban communities with large populations of families of color. To align available resources more equitably, school districts must first determine the needs of the schools in their communities. One effective tool used to pursue resource equity in schools is the equity audit.

Equity Audits

Equity audits were broadly applied by the United States government during the Civil Rights era and have since been used by institutions to identify problems of equity, whether related to academic access or resource distribution. Berne and Stiefel (1984, 1994, 1999) performed ground-breaking work in the use of equity audits to assist in ensuring equitable distribution of resources within school districts. They evaluated school-level expenditure data from the perspective of providing schools with an equitable share of school district financial resources. They not only evaluated the amount of resources allocated to schools but also assessed the quality of those resources. Recognizing that a large amount of funds is used to provide staff to schools, they discussed the number of positions and amount used to support salaries on a per-pupil basis and asked questions about why one school may have a representatively larger number of lower-paid staff than another school. Berne and Stiefel began the exploration of intradistrict school resource equity but struggled early on in their research with the quality of the available data. In 1984 and 1994 in particular, they recommended a clearer accounting of school-level expenditures rather than aggregating large categories of cost into a system-level pool. This practice obscured the actual spending at individual school levels. In their later work, the data

quality improved and other researchers benefited from more accurate data when pursuing the same topic of resource equity.

Skrla et al. (2004, 2009) expanded on Berne and Stiefel's work and developed equity audits to examine school district resource allocation of their own. Their studies identified and examined twelve equity indicators in three broad categories: teacher equity, programmatic equity, and achievement equity. Their work defined teacher equity using teacher credentials, experience, effectiveness, and longevity. Programmatic equity was defined as student programming, such as support for English learners, special education, and gifted programs. Achievement equity was defined as student performance on state standardized testing, school completion rates, and post-graduate enrollment in higher education or career programs. Their goal was to create a framework to develop simple, easily understood tools to examine possible inequities within school districts. Their work has been widely cited and adapted to numerous equity audits performed across the United States.

Equity audits served as the foundational pursuit of numerous studies. Stephanie Levin (2012) employed both qualitative and quantitative strategies to examine intradistrict resource equity in a mid-sized urban school district during the 2009-2010 school year. She conducted interviews to understand decision-making processes and utilized financial and demographic data from district and state sources to analyze per-pupil expenditures and how money was spent. Her findings indicated inequities, particularly in the allocation of staff resources and teacher efficacy. Rebecca Wolf (2014) performed an equity audit of within-school distribution of teachers, examining class sizes, teacher experience, and student performance in English, Math, and the number of advanced placement courses taken. Her findings indicated disparities in the educational experience of minorities and students from low socio-economic backgrounds as

compared with other students. Nicole Duplain (2021) performed a study using Skrla et al's framework and examined the per pupil expenditure, teacher quality, and student academic achievement data through an a priori lens. Her study findings showed varying levels of resource inequity. These and other, similar studies provide sufficient evidence that equity audits can be a valuable tool to help administrators identify resource inequities and address systemic disparities in students' educational experiences. Resource, teacher, and outcome equity will be the focus of this study in examining resource equity of high schools in a large, urban Oklahoma school district.

The Importance of Urban School Districts

This study focused on the impact of equitable resource distribution within a large, urban school district in Oklahoma. Welsh and Swain (2020) note that conversations around urban school districts typically focus on inner-city schools, located within large urban areas. They indicated that while the concept of urban education is often seen as "monolithic" (p. 97), more accurate defining terms would be dynamic, complex, or diverse and such districts often share certain common characteristics. They are diverse in terms of race, ethnicity, and language; forming their own form of heterogeneity that is not reflected by surrounding suburban or rural communities. Many families served by urban districts come from low socio-economic backgrounds and experience economic hardships. Urban schools frequently face resource challenges such as inadequate funding, outdated or insufficient materials and technology, and deteriorating facilities and infrastructure. Attracting and retaining high-quality teachers and leaders can be difficult for urban schools, rendering them to struggle with historic or systemically high levels of inequality and segregation. There are real or perceived greater issues with educational outcomes, graduation rates, and student behavior. They struggle with a lack of

robust community and family support. Finally, urban schools face institutional failures that are related to the previously identified characteristics. These mostly negative characteristics represent common challenges for educators in urban school districts; however, through study, effective policies and practices can be identified to produce positive and lasting change.

The study of urban school districts is crucial for promoting equity and social justice, as these districts frequently serve a significant number of students from historically marginalized groups. A deeper understanding of urban education aids in identifying and creating targeted policies and practices that address the distinct challenges faced by these districts (Welsh & Swain, 2020). Attention to urban schools ensures equitable and effective resource distribution, catering to the specific needs of under-resourced schools (Rubenstein et al, 2006). Moreover, urban districts are often diverse, making them vital for fostering cultural competence and preparing students and educators for a global society (Roza & Hill, 2004; Welsh & Swain, 2020). As urban areas continue to grow, understanding their educational landscape becomes increasingly important for societal development. Additionally, such study informs teacher education, equipping educators and leaders to succeed in varied and demanding environments (Welsh & Swain, 2020).

A final consideration that supports the study of urban schools is related to the resources available to these schools. The nation's schools most often identified as failing are often located in large urban school districts. Sentiments similar to the quote from former President Obama that the location where a child lives should not dictate the quality of their education are often expressed by education administrators, pundits, and politicians. Keeping sentiments aside, research shows the unfortunate reality that a child's neighborhood and their family's wealth often determine their school's access to the resources necessary to provide that child with a

quality education. Research has also shown that schools serving more significant concentrations of families of color or low socio-economic students are more likely to be in poor condition and staffed by less experienced teachers. These schools are most often located in urban locations rather than in suburban and rural areas and are located in neighborhoods with high concentrations of poverty, resulting in these schools receiving less per-pupil funding than schools located in the same district (Condron & Roscigno, 2003; Roscigno et al., 2006; Webb, 2017; Welsh & Swain, 2020). By carefully examining urban school districts, we can gain insights that are essential for shaping the future of education and ensuring that all students have access to quality learning experiences.

Summary

Several conclusions may be inferred from examining available literature produced by the field. The availability of resources positively impacts the academic outcomes of children, whether these resources are from the school or the home. Schools with more significant proportions of students from lower-resourced homes require additional resources to compensate for students experiencing such positive outcomes. The pursuit of resource equity is a means to ensure that students and schools obtain adequate resources. There are several forms of equity to consider; horizontal equity, which is concerned with equal access to similar services; vertical equity, which encourages the identification of specific needs and mitigation of related inequities; and equity of opportunity, which links horizontal and vertical equity into a framework for providing necessary resources for positive student outcomes. A weighted system of financial resource disbursement is one method for ensuring equitable resource distribution within school districts. Tensions created by unmindful funding models, such as staff-based budgeting, result in intradistrict resource inequities, particularly in high-poverty schools. Equity audits are valuable

tools for examining equitable resource distribution within districts. Finally, while a statewide examination of intradistrict resource equity is possible, a closer look at urban school districts is more valuable due to the higher concentrations of traditionally underserved student populations. The next chapter delves into this study, the data collected, and the measures taken to determine if equity was observed in the sample drawn from a local district.

Chapter 3 Research Design

Introduction

Achieving equitable resource distribution at the school district level is a pressing concern that transcends geographical boundaries and socioeconomic disparities (Baker & Corcoran, 2012; Darling-Hammond, 2019). The historical focus of the field has been on interdistrict equity, examining how states provide resources to school districts, resulting in a smaller body of research regarding intradistrict equity, exploring how school districts resource their schools. The purpose of this study was to provide local context to the issue of intradistrict resource equity by examining how one urban school district in Oklahoma provided resources to its high schools. To identify and address the disparities in state and local funding allocated to schools within districts, this chapter discusses the quantitative research design necessary to complete a rigorous investigation of this important issue and answer the following research questions:

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

RQ2. Is there a significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's State report card?

This study endeavored to answer these questions by examining the three previously discussed dimensions of equity, horizontal, vertical, and opportunity, through the lens of Owens and Kaplan's (2023) Critical Resource Theory (CReT). As described by Owens and Kaplan, CReT includes five steps that guide researchers from questioning existing practices, compiling data and presentation, to communicating findings to the community with the ultimate intention of advocating for systemic change. This approach underpins the focus of this study (p13).

The core mechanism used to evaluate data in this study was an equity audit similar in nature to that used by other researchers. This study was similar in scope to several other studies; Rebecca Wolf's (2014) study of twenty schools' within-school resource equity, Nicole Duplain's (2021) study that examined intradistrict resource distribution to schools in a single district, and Christen Cohoon's (2021) study, which assessed intradistrict resource equity in five middle schools in the same district. This equity audit was also similar to Skrla et al.'s (2009) assessment, which was informed by earlier audits performed by Berne and Steifel (1999). Locally, Ballard and Maiden (2018) examined how student achievement was impacted by resources in Oklahoma schools. All of these researchers performed similar studies wherein they linked the equitable distribution of resources at the school level to student achievement on state test results. In addressing the research questions, this work predominantly used the same financial categories as Wolf's study, controlled for federal funds, and obtained the necessary archival information from the Oklahoma State Department of Education's website and by request to the sample district under examination.

A school resource equity audit depends largely on the financial resources allocated; this study examined both direct monetary expenditures by schools and the accompanying staff which comprise the bulk of any investment. To quantify expenditures, school districts in Oklahoma are required to utilize the Oklahoma Cost Accounting System's (OCAS) coding to categorize spending and report spending information to the State on an annual basis. The OCAS codes are separated by relevant "function", providing a structured view of resource distribution, as noted in Table 3.1 below:

Table 3.1

Sample School Financial Expenditure Data

OCAS Function Code	Description	Amount
1000	Instruction	$8,210,567.93
2100	Support Services – Students	$1,191,688.18
2200	Support Services – Instructional Staff	$519,546.88
2300	Support Services – General Administration	$1,283.40
2400	Support Services – School Administration	$843,835.22
2500	Support Services – Central Services	$752,755.60
2600	Operation and Plant Services	$752,755.60
2700	Student Transportation Services	$604,298.54
3100	Child Nutrition Services	$604,298.54
3200	Enterprise Operations	$3,021.25

Note. Data from the OSDE district financial website (https://sdeweb01.sde.ok.gov/OCAS_Reporting)

Skrla et al.'s (2009) three classifications of equity, vertical equity, horizontal equity, and opportunity equity, were used as focal points for evaluating the study results. The research design, data sources, variables, and analytical techniques were carefully chosen to navigate the complex issue of educational equity. Committed to ethical research practices, this research examined some of the most important nuances of resource allocation with the ultimate goal of contributing empirical insights that may guide local policy reforms and foster greater equity in educational opportunities for all students.

Sample Selection and Context

For the study, the 2018-19 school year was considered the most relevant for the analysis of resource equity, given that the subsequent COVID-19 pandemic disrupted state allocations and school district spending patterns. For the study period, Oklahoma's public school enrollment

was 698,586 students in a statewide school system, comprising 512 public school districts and 30 public charter schools. The 512 school districts contained 988 elementary schools, 240 middle schools, and 452 high schools amounting to a total of 1,802 school sites throughout the state. Statewide, Oklahoma expended $6,150,532,774.89 in state funding on educational services during the 2018-2019 school year (Oklahoma State Department of Education, School District Financial Information). While impressive, a statewide sample size was outside this study's scope particularly because it included non-urban schools and other data elements irrelevant to the research questions. In addition, Oklahoma possesses several public charter schools, both physical and virtual, which serve specific populations of students or are funded by the State rather than a local distribution method.

The school district chosen for this study comprised thirty-three elementary schools, twelve middle schools, eight high schools, and four alternative schools. The student community served by the district was diverse, both in terms of socio-economic status and ethnicity. For the 2018-2019 school year, the district possessed an enrollment of 37,530 students, of which 7,861 students were enrolled in grades 9th through 12th. Table 3.2 exhibits the major student demographic categories, and the percentage of overall district enrollment represented by each student demographic category. Table 3.3 presents the same demographic breakdown but relative to each high school involved in the study.

Table 3.2

Student Demographic Composition – Percentage of District Enrollment

Category	Percentage
Black	21.3

Category	Percentage
Hispanic	54.9
Asian	2.2
White	13.5
American Indian	2.7
Multiple Races	5.4
Economically Disadvantaged	83
Bilingual	36.5
Special Education	15

Note. Data for this table was extracted from the OSDE school report card website (https://oklaschools.com)

Table 3.3

Student Demographic Composition – Percentage of School Enrollment

Category	School 1	School 2	School 3	School 4	School 5	School 6	School 7	School 8
Black	12.1	16.9	81	67.5	17.6	12.2	68.3	8.5
Hispanic	71.4	19.9	8	12.8	55.9	71.2	12.4	76.9
Asian	.8	14.4	.6	2.3	5.2	1.6	1.3	.8
White	9.7	40.3	4.1	9.6	13.4	10.7	10.4	8.9
American Indian	3.1	3.9	2	2.5	3.7	2.3	3	3.5
Multiple Races	2.9	4.6	4.3	5.3	4.2	2	4.6	1.4
Economically Disadvantaged	62.5	15.1	77.1	60.2	51.6	45.5	72.8	57.6
Bilingual	38.4	1.2	3.3	5.1	33.6	19.7	5.6	40
Special Education	17.5	5	29.6	23.4	18.3	12.5	29.7	16.1

Note. Data for this table was extracted from the OSDE school report card website (https://oklaschools.com)

For the 2018-2019 school year, the district employed 4,676 staff. Of this number, 1,917 were classroom teachers, and 401 were employed at high schools. Tables 3.4 and 3.5 present the breakdown of teacher education levels and experience (School District, 2020).

Financially, the district expended $368,500,597.58 from its general fund. Of this amount, $188,080,986.52 (51.04%) was spent on instructional services, $20,837,723.22 (5.7%) on school administration, and a further $7,272073.21 (2%) was used to support school libraries and $7,202683.54 for school counseling services. A final sum of $2,438621.21 (.7%) was expended on nursing services (Oklahoma State Department of Education, School District Financial Information, 2023).

To address the research questions and maintain a manageable sample size, this study focused on the eight traditional high schools and the 7,861 students enrolled in 9th through 12th grades that were resourced by the district (Oklahoma School District Financial Information, 2023). This study was intentionally based in Oklahoma to examine and pursue the concepts of equity resource theory, to inform local practice in school districts, to add to the growing body of related research, and to promote more equitable resource distribution across schools.

Research Design

Data Collection and Sources

Data elements were collected from various sources to answer the research questions. The data collected included student demographic data, personnel data, teacher quality, and student outcomes. Student demographic data were represented by the number of students enrolled in each school under each racial and ethnic group, the number of students who qualified as economically disadvantaged, and the number of students who were served through specific

programs such as those designed for students with disabilities or English learners. Student demographics, along with the WSF weights provided metrics to determine vertical equity.

The second data category consisted of personnel data, comprising the number of full-time equivalent classroom teachers, their educational attainment, their experience years, the number of teachers who were emergency certified, and the number who were teaching out of their field of expertise (i.e., holding a teaching license but not certified in the subject area to which they were assigned). The third data category was the per-pupil expenditures related to costs necessary for the operation of the school buildings. Personnel and per-pupil expenditure data established comparative data benchmarks for horizontal equity.

The fourth data category was academic achievement, represented by the numerical value assigned to the academic achievement section of each school's state report card. Student outcome data were necessary as a means to establish equity of opportunity for each school.

All data, except the teacher-specific data, were collected from the Oklahoma State Department of Education's archival school transparency website and school report card website. School staff data were collected directly from the school district through a research data-sharing request. No personally identifiable information was requested or provided through the data collection process.

Population

This study involved eight brick-and-mortar high schools in an urban Oklahoma school district. Each school from the anonymous school district was assigned a numerical designation. Student demographic data were obtained from the OSDE for each sample school through the publicly available information on the OSDE's website. The student demographics for each school in the sample included the total number of students counted in each school's

average daily membership (ADA) for the 2018-2019 school year. The ADA was then disaggregated further by student racial/ethnic groups: Black, Hispanic, Asian, White, American Indian, Native Hawaiian/ Pacific Islander, and multiple races.

Further disaggregation determined the number of students who qualified as economically disadvantaged, the number of bilingual students, the number of students enrolled in a special education program (all categories combined), and the number of gifted students. These characteristics are representative of the significant Oklahoma student category weights (Maiden, 2001) related to the Oklahoma State aid formula. The characteristics and weights provided a basis for comparing the recognized cost groups to educate certain classifications of students and the actual per-pupil expenditures of the sample schools. The student enrollment for the district involved in the 2018-2019 school year study was 37,530. This study examines the eight traditional high schools and their constituent 7,860 students; demographic data are presented in Table 3.4.

Table 3.4

Student Demographics

	School 1	School 2	School 3	School 4	School 5	School 6	School 7	School 8
Black	193	95	397	358	245	91	269	183
Hispanic	1142	112	39	68	778	530	49	1653
Asian	13	81	3	12	72	12	5	17
White	155	227	20	51	186	80	41	191
American Indian	50	22	10	13	51	17	12	75
Multiple Races	46	26	21	28	58	15	18	30
Economically Disadvantaged	1000	85	378	328	718	339	287	1238

	School 1	School 2	School 3	School 4	School 5	School 6	School 7	School 8
Bilingual	614	7	16	27	467	147	22	860
Special Education	280	28	145	124	255	93	117	346

Note. Data for this table was extracted from the OSDE school report card website (https://oklaschools.com)

Research Questions, Data, and Measures

The most efficient and reliable means to address the research questions was to employ quantitative analysis. The study utilized a Resource Equity Theory lens to identify any gaps in resource allocation from the school district to the eight high schools chosen as the sample for the study. The equity dimensions presented by Skrla et al. (2009), horizontal, vertical, and opportunity, informed the data elements chosen for the study and the research methods utilized to evaluate the data to answer the research questions. There was one data element, student achievement, and a set of other data elements (in ten parts), representing per pupil expenditures utilized in this study to answer the research questions, and the collected data were processed using well-established methods.

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

To answer RQ1, an evaluation of the unweighted and weighted per pupil expenditures (PPE) for each of the eight study schools was performed. Unweighted PPE was established if there was a difference in PPE solely based on student enrollment. Weighted PPE established if there was a difference based on specific subgroups of students. The data were subjected to several analytical techniques to determine the differences in expenditure distribution in comparing the eight schools.

Unweighted PPE

For horizontal equity, each school's unweighted per-pupil expenditure data were used. The “Cents per dollar” approach was used to compare relative expenditure data between schools. To calculate cents per dollar, each school’s PPE was divided by the PPE of the school with the highest expenditure. For example, assume School 1 had the highest PPE at $13,000. Then, each school’s PPE would be divided by this amount to determine the cents per dollar. If School 2 had a PPE of $10,000, the cents per dollar value for School 2 would be .77 cents. This would mean that School 2 spent .77 cents for every $1 that School 1 had spent.

Weighted PPE

To represent vertical equity, combined weighted data for student demographics and teacher quality were used. Vertical equity addresses the concept that groups of students with specific needs should be treated differently, such as by increasing resources and services proportionate to those needs and, conversely, increasing the cost to educate such students. For example, the intrinsic cost to educate an English Learner (EL) student is inherently higher than a student who does not have the same needs, resulting in a greater need for resources so the EL student may receive the same level of education as the non-EL student. A weighted student funding approach is used in Oklahoma to represent these additional costs. Similar to additional costs associated with educating students with particular characteristics, teacher education and experience play a role in additional costs to ensure such educators are effectively educating students (Darden & Cavendish, 2011; Stiefel et al, 2004; Miles, 2003). As was discussed in Chapter 2, schools with higher populations of students with specific needs are often served by teachers with less education and experience, or less qualified teachers, further complicating

resource equity. Studies such as those conducted by Verstegen and Driscoll (2008) used weighted student per-pupil measurements.

Student Weights: Rather than replicating the weights other researchers have used, this study used the same weights as those found in the Oklahoma State Aide funding formula, ensuring that the Oklahoma weights were more relevant to this study and would better inform local practice (70 O.S. §18-201.1). This study examined the data elements of students identified as economically disadvantaged, students with disabilities, and English learners. The weight for the economically disadvantaged students was .3 per student. The funding formula included a range of weights for different identified disabilities. To simplify data collection and analysis, the mean weight of 1.97 was used for this study. The weight for English learners was .25 per student. Weights were calculated by multiplying the number of each category of students by 1 plus the assigned weight. For example, a student identified as economically disadvantaged would be attributed a total weight of 1.30, while a student who was identified as bilingual and economically disadvantaged would have an assigned weight of 1.55. The relevant State student funding weights are presented in Table 3.5.

Table 3.5

Total Student Funding Weights by School

Category	Weight
Economically Disadvantaged	.30
Bilingual	.25
Special Education	1.97

Note. Student funding weights were collected from 70 O.S. §18-201.1

Teacher Quality. This study also included an examination of teacher quality, as a significant factor in resource equity. The Oklahoma weighted funding formula included consideration for teacher education and experience, recognizing the impact of these factors on the cost of providing quality education. The researcher used the same weights presented by Oklahoma law**,** reflecting the state's valuation of teacher qualifications that are presented in Table 3.6 below.

Table 3.6

Teacher Experience-Degree Index

Years of Experience	Bachelor's Degree	Master's Degree	Doctor's Degree
0-2	.7	.9	1.1
3-5	.8	1.0	1.2
6-8	.9	1.1	1.3
9-11	1.0	1.2	1.4
12-15	1.1	1.3	1.5
Over 15	1.2	1.4	1.6

Note. Collected from 70 O.S. § 18-201.1

The teacher index weights presented above were intended by the State to provide school districts with additional resources in partial compensation for the additional costs associated with retaining more educated and experienced teaching staff. For the purpose of this study, the opposite was intended; the researcher wished to demonstrate the additional or reduced costs resulting from more educated, experienced teachers working in schools. To represent these variations in cost, the researcher used district-provided, anonymized teacher data and applied

each teacher's state-assigned weight, according to their education and experience. The cumulative weight for each school was calculated and expressed as a negative number when the overall weighted PPE total for each school was determined. Table 3.7 presents the number of teachers under each category of educational attainment, while Table 3.8 illustrates the number of teachers who fall under each State category of teaching experience.

Table 3.7

Teacher Education

	Bachelors	Masters	Doctorate
School 1	38	35	0
School 2	30	16	1
School 3	14	10	0
School 4	13	14	1
School 5	49	19	2
School 6	22	14	2
School 7	12	6	0
School 8	70	32	1

(School District, 2020)

Table 3.8

Teacher Years of Experience

	0-2	3-5	6-8	9-11	12-15	15+
School 1	18	13	10	7	5	20
School 2	10	5	04	3	2	23
School 3	5	2	3	2	3	9

	0-2	3-5	6-8	9-11	12-15	15+
School 4	3	3	1	3	6	12
School 5	18	12	4	8	6	22
School 6	5	3	7	4	3	16
School 7	3	3	1	1	0	10
School 8	33	23	14	11	8	14

(School District, 2020)

Measurements

The collected data were subjected to the following assessments to determine the per-pupil expenditure differences across the sample schools.

Coefficient of Variation (CV) - The CV is a univariate statistic used to express data variability. The positive value produced ranges from 0, denoting no variability, to 1 (or possibly higher), showing great variability. A lower CV would indicate greater equity, while a higher number would conversely represent inequality (Maiden, 2019). The CV was instrumental as a primary tool used to visualize the dispersion of the PPE and identify trends along a mean value.

$$CoV = \frac{\sigma}{\mu}$$

Gini Coefficient (GC) - The GC is a bivariate statistic used to determine wealth neutrality or equitable distribution of income. Similar to the CV, the GC yields a positive value between 0 and 1, with 0 indicating complete equity and 1 indicating complete inequity. A 45-degree line across the GF graph, starting from 0, represents complete equity. Any numbers below the perfect equity line represent varying degrees of inequity (Maiden, 2019). The GC was used to represent all the values in the population across the dispersion line, and the Lorenz curve, a bowed curving line that falls below the mean, is particularly useful for identifying gaps in equitable PPE.

$$\frac{A}{(A+B)} = 1 - 2B$$

Theil Index (TI) - The TI is a measurement that calculates the difference between maximum entropy and observed entropy. The result of the TI is expressed as a negative entropic value between 0 and 1; a higher number indicates greater equity (US Census Bureau, 2021). The TI was important to this study as a means to evaluate weighted PPE between schools and was used in this study, along with the CV and GC, to identify gaps in the weighted PPE.

$$\mathrm{T_{indiv}} = \sum_{\mathrm{i=1}}^{\mathrm{n}} \left[\left(\frac{1}{\mathrm{n}} \right) \cdot \left(\frac{\mathrm{v_i}}{\mu} \right) \cdot \ln \left(\frac{\mathrm{v_i}}{\mu} \right) \right]$$

McLoone Index (McL) - The McL compares the identified mean value for income distribution to the equity gap indicating the number needed to raise the gap to the median, thereby the amount needed to reach equity (Maiden, 2019). The McL is represented by a number between 0 and 1 with a higher number indicative of greater equity and a desired target of .90 or greater.

$$McL = \sum \frac{(expenditure\ at\ or\ below\ the\ median)}{(Number\ at\ or\ below\ the\ median) \times (the\ median\ expenditure)}$$

RQ2. Is there a statistically significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's State report card?

The purpose of RQ2 was to assess equity in the relationship between student outcomes and PPE and not establish a cause/effect assessment. To answer RQ2, the dependent, student achievement, was compared separately to the unweighted and weighted PPE. While RQ1 involved a simple analysis of the existence and extent of differences in PPE present at each school, RQ2 introduced student academic achievement reported on State report cards for each

school to determine if the equitable distribution of resources at the school level had an impact on student achievement.

Student Achievement: Student achievement data were collected as a number value from each school's State-issued A-F report card. The report card's academic achievement component comprised three sections, English, Math, and Science, each with a maximum allowable score of 15, allowing for a composite score of up to 45. For this study, the composite score was used, as it is a numeric measurement that represents the percentage of students who perform at or above grade level on a state-recognized assessment. The numeric value representation is inclusive of all students, specifically including populations of students central to this study, such as students with disabilities, economically disadvantaged students, and English language learners.

Measurements: The results from RQ1 were subjected to an additional test to determine the extent to which the unweighted and weighted PPE of each school contributes to student achievement. The McLoone Index was utilized to identify any gaps in equity related to how the school district provided funding to the sample schools.

Pearson Correlation Coefficient (r) – This is a tool used to investigate the relationship between two variables. If the r is at or above 1, the correlation is perfect, with any result between .50 and 1 evidencing a strong correlation (Obilor & Amadi, 2018).

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Reliability and Validity

All data elements for this study are considered reliable and valid indicators for examining intradistrict resource equity, aligned with Oklahoma financial, staffing, and academic achievement records, and are consistent with the concepts presented by Critical Resource

Theory. Student demographic data included enrollment numbers for the 2018-2019 school year, which were disaggregated into relevant subgroups in alignment with the state funding formula: grade level, racial/ethnic, economically disadvantaged, bilingual, and special education services. Personnel data collected comprised full-time equivalent (FTE) positions for both administrative/professional and classified staff. Administrative and professional staff were defined as classroom teachers, principals, assistant principals, counselors, nurses, and library media specialists. The study also considered the highest education attained by these staff as a measure of teacher quality. Classified staff included clerical staff and school security. An open records request was necessary to obtain the numbers of FTEs and salary amounts by category for personnel from the school district; however, no personally identifiable information was requested or collected. Operational cost data, represented on a cents per dollar basis, comprised school-level per-pupil expenditures from the following categories: instruction, support services (combined), operation and maintenance, student transportation, child nutrition programs, and enterprise operation. At the school level, all cost data were reported by districts to the Oklahoma State Department of Education and available for public access in an online archival format.

Limitations and Delimitations

Inherent in this type of focused study are several limitations. A significant limitation is the absence of an evaluation of funding mechanisms; this study will examine how schools are funded and determine if significant relationships exist between funding and student outcomes for schools with larger populations of students in need. An additional limitation of this study is that no evaluation of the types of expenditures will be made; the study will examine a flat PPE for each school, inclusive of several financial categories of expenditures, exclusive of federal funds. A final, general limitation of this study is that it will not consider any non-reported expenses that

may influence student outcomes, such as parent-teacher organization investments, textbook expenses, fundraising activities, or community investments and programs.

Several statistical limitations were navigated in constructing this study through the lens of Critical Resource Theory (Owings and Kaplan, 2022). While the weights of certain student demographic populations were obtained from State law, there are 13 different weights for students with disabilities. To simplify data collection and analysis, the researcher decided to use the mean of the weights, 1.97 as a representative number sufficient to exhibit the additional costs associated with educating students with unique needs. An additional limitation involved the representation of teacher quality. The teacher index weight assigned by the State was based on the level of education attained by teachers and their years of experience in education. While the State index weight was a positive number that provided additional funding for retaining more educated and experienced teachers, the researcher chose to represent the index weight as a negative value. The negative number for this study assumed the inherent reduced cost associated with supporting less educated or experienced teachers. The impact on data analysis changed little with a positive or negative teacher index weight and the negative value was more appropriate to this research.

One delimitation for this study was a sample size of eight high schools in an Oklahoma urban school district. Another delimitation is the examination of a single past fiscal year. The study specifically examined the 2018-2019 fiscal year, chosen for this study as the most recent and appropriate year to examine school financial data without the potential influence of the COVID-19 epidemic on district and school spending, during the 2019-2020 school year.

Ethical Considerations

This study did not involve human subjects. While some personnel data were requested from the school district, no personally identifiable information was requested or provided. Student demographic data was collected from a state website and did not contain any information that would pertain to specific students.

Summary

Chapter 3 discussed the research methodology employed for this study, the data used, the methods of data collection, and the statistical tools used to analyze the data. This study applied concepts around the equitable distribution of resources as pioneered by Berne and Stiefel (1984) through the lens of Critical Resource Theory and equity audits presented and pursued by Owings and Kaplan (2022), all of whom created groundbreaking research in applying equity audits to public education. Horizontal equity was determined by comparing per-pupil spending from a dollar and cents approach. Vertical equity was analyzed by application of weighted student and teacher categories much like those used by Verstegen and Driscoll (2008), using the weights found in Oklahoma's state funding formula. This study highlighted how resources are distributed to Oklahoma schools with the intent to influence the review or creation of more deliberate resource distribution systems within school districts.

Chapter 4 Results

Introduction

The purpose of this study was to explore intradistrict resource equity, the allocation of resources by school districts to schools, rather than interdistrict resource equity, which pertains to how states resource school districts. What follows is a restatement of the research questions, a brief description of the methods and tools used to analyze the data collected and an examination of the results produced by the study.

Education finance equity is of broad interest to the entire field of education; however, this study intended to inform local resource allocation practice by providing insights into intradistrict resource equity in the state of Oklahoma. There has been a large amount of research and discourse around the responsibility of states to ensure adequate resources for public education. This burden is central to the maintenance of a vibrant, democratic society (Webb, 2017; McKown, 2013). Gaps in student achievement have been shown to be linked to the investment of public funds, with disparities in funding resulting in lower student achievement (Handel & Hanushek, 2023; Ballard & Maiden, 2018; Webb, 2017; Henry et al., 2010; Jimenez-Castellanos 2010; Nyhan & Alkadry, 1999; Heise, 1998). There is a general lack of study and literature examining how Oklahoma school districts provide resources to their constituent schools.

The data used in this study were sourced from the 2018-19 school year, chosen as the most representative year to collect data before the impact of the COVID pandemic and subsequent, Congressionally authorized federal stimulus funds on school district finances. The study examined eight high schools in a single urban school district, possessing a diverse student body and data relevant to the investigation. The study examined per pupil expenditures, both unweighted and weighted, of 8 urban high schools from the same school district. It is believed

that the methods and process of pursuing equity observed in this study may be applied broadly, regardless of district size and composition, to inform local practice in school districts, encourage more intentional distribution of resources, and ensure a positive impact on student achievement through equitable resourcing of schools.

There were multiple data elements involved in this study to examine district financial dispositions and determine if the level of unweighted and weighted per-pupil expenditures (PPE) at the sample schools had a statistically significant effect on student achievement. This study examined total PPE and only instructional PPE on an unweighted and weighted basis to ascertain the extent to which the schools were equitably served by the district. The methodology and statistical analysis tools employed allowed for a comprehensive evaluation of the collected data. While the stated purpose of this study was to answer the research questions, the intended goal was to inform local practices in Oklahoma and highlight the importance of intradistrict resource equity.

Descriptive Statistics

The following questions were chosen for this study and data were collected from State and district sources to address these questions:

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

RQ2. Is there a significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's state report card?

This study included several data elements chosen as the primary vehicle to address the two research questions. The data elements chosen to evaluate RQ1 were total unweighted PPE, total

weighted PPE, instructional unweighted PPE, and instructional weighted PPE. The same data elements were used to answer RQ2, with the addition of student academic achievement.

Unweighted PPE

Financial data were collected from the OSDE financial transparency website. Financial data are reported by all school districts and are coded using the Oklahoma Cost Accounting System financial dimensions. Both total and instructional PPE were examined as part of this study and were calculated by dividing the sum of the costs by the enrollment for each school. Unweighted PPE was a critical data element in examining horizontal equity to ascertain the extent to which the schools were resourced.

Table 4.1: Total Unweighted PPE by School

School	Total Enrollment	Total Expenses	Unweighted PPE
School 1	1599	$9,390,591.21	$5,872.79
School 2	563	$4,289,164.83	$7,618.41
School 3	490	$4,130,998.90	$8,430.61
School 4	530	$4,373,183.70	$8,251.29
School 5	1391	$8,902,650.38	$6,400.18
School 6	745	$4,789,672.05	$6,429.09
School 7	394	$4,503,944.44	$8,893.26
School 8	2149	$11,438,482.30	$5,322.70

Table 4.2: Instructional Unweighted PPE by School

School	Total Enrollment	Total Expenses	Unweighted PPE
School 1	1599	$6,916,362.57	$4,325.43

School	Total Enrollment	Total Expenses	Unweighted PPE
School 2	563	$2,774,908.77	$4,928.79
School 3	490	$2,763,291.30	$5,639.37
School 4	530	$2,943,948.60	$5,554.62
School 5	1391	$6,555,963.83	$4,713.13
School 6	745	$3,312,381.75	$4,446.15
School 7	394	$2,334,083.58	$5,924.07
School 8	2149	$8,471,766.31	$3,942.19

Weighted PPE

Student demographic data were important for this study as a means to define vertical equity. Student demographic data were collected from the OSDE School Report Card website and were comprised of two types of data, race/ethnicity, and student subgroup populations, as presented in Table 3.6. It was possible and appropriate for students to fall within more than one demographic category for the calculation of financial weights. The researcher used weights provided by Oklahoma law (70 O.S. §18-201.1), as presented in Table 3.7. Categorical and total weights for each school were calculated by multiplying the number of students identified under each category by 1 plus the assigned weight. For example, a student identified as economically disadvantaged, with a .30 weight, would be attributed a total weight of 1.30, while a student who was identified as bilingual and economically disadvantaged would have an assigned weight of 1.55. Table 4.3 illustrates the amount of student funding weight by category for each school.

Table 4.3: Total Student Funding Weights by School

School	Economically Disadvantaged	Bilingual	Special Education	Total Student Weights
School 1	300	153.50	551.57	1,005.08
School 2	25.50	1.69	55.46	82.65
School 3	113.40	4.04	285.73	403.17
School 4	98.42	6.76	244.32	349.50
School 5	215.41	116.84	501.47	833.72
School 6	101.69	36.75	183.16	321.60
School 7	86.10	5.52	230.53	322.14
School 8	371.41	214.90	681.60	1267.91

Teacher Index Weights

The researcher chose to include a measurement to evaluate teacher quality for this study. Oklahoma's weighted funding formula includes a teacher index weight (Table 3.6) that utilizes each respective teacher's level of educational attainment and cumulative teaching experience. The data presented in Tables 3.7 and 3.8 were used to determine the total teacher index weights for each school, presented in Table 4.4. These weights were represented as a negative number as it was the researcher's intent to represent the reduced cost of retaining more educated and experienced teachers.

Table 4.4: Total Teacher Index Weights

School	Teacher Index Weights
School 1	-75.5
School 2	-51

School	Teacher Index Weights
School 3	-25.9
School 4	-32.6
School 5	-71.4
School 6	-42.3
School 7	-19.6
School 8	-97.5

Net Weights

The net weights for each school were calculated by summing the total student funding weights and total student enrollment less teacher index weight.

Table 4.5: Total Weights

School	Net Weights
School 1	929.58
School 2	31.65
School 3	377.27
School 4	316.90
School 5	762.32
School 6	279.30
School 7	302.54
School 8	1170.41

Weighted PPE

The weighted PPE was calculated by dividing total and instructional costs by the sum of the school enrollment and total weights. Tables 4.6 and 4.7 present the weighted total and instructional PPE for each school.

Table 4.6: Total Weighted PPE by School

School	Total Enrollment	Net Weights	Total Expenses	Weighted PPE
School 1	1599	929.58	$9,390,591.21	$3,713.78
School 2	563	31.65	$4,289,164.83	$7,212.94
School 3	490	377.27	$4,130,998.90	$4,763.24
School 4	530	316.90	$4,373,183.70	$5,163.77
School 5	1391	762.32	$8,902,650.38	$4,134.38
School 6	745	279.30	$4,789,672.05	$4,676.03
School 7	394	302.54	$4,503,944.44	$5,030.51
School 8	2149	1,170.41	$11,438,482.30	$3,445.94

Table 4.7: Instructional Weighted PPE by School

School	Total Enrollment	Net Weights	Instructional Expenses	Weighted PPE
School 1	1599	929.58	$9,390,591.21	$2,735.28
School 2	563	31.65	$4,289,164.83	$4,666.47
School 3	490	377.27	$4,130,998.90	$3,186.21

School	Total Enrollment	Net Weights	Instructional Expenses	Weighted PPE
School 4	530	316.90	$4,373,183.70	$3,476.16
School 5	1391	762.32	$8,902,650.38	$3,044.58
School 6	745	279.30	$4,789,672.05	$3,233.79
School 7	394	302.54	$4,503,944.44	$3,350.98
School 8	2149	1,170.41	$11,438,482.30	$2,552.19

Student Achievement

The purpose of this study was to examine district resourcing of schools to determine if there is a statistical relationship between the per-pupil expenditures at the school level and student academic achievement. Student achievement was used for RQ2 and was collected as a numeric value from each school's State-issued A-F report card as reported on the Oklahoma State Department of Education's (OSDE) website. The report card's academic achievement component comprised three sections, English, Math, and Science, each with a maximum allowable score of 15, allowing for a composite score of up to 45 points. For this study, the composite score was used, representing a numeric measurement of the percentage of students who performed at or above grade level on a state-recognized assessment.

Table 4.8: Student Achievement

School	Student Achievement Points
School 1	2.4
School 2	44.8
School 3	1.5

School	Student Achievement Points
School 4	4.6
School 5	1.2
School 6	18
School 7	4.4
School 8	3.2

Resource Accessibility Results

Research Question 1

The first research question for this study was chosen to determine the extent to which per pupil expenditures were distributed equitably across high schools in an urban Oklahoma school district. The weighted and unweighted PPE of both instructional and total expenses were used in this analysis. The evaluative tools used to examine the data for RQ1 included the Coefficient of Variation (CV), the Gini Coefficient (GC), the Theil Index (TI), and the McLoone Index (McL). The results of these measurements are provided and discussed below.

Coefficient of Variation.

The CV was used to express variability in the data, producing a range between 0 and 1 with higher numbers indicative of greater variability. The formula for calculating CV was the ratio of the standard deviation to the mean. The result was expressed as a percentage but was converted to a ratio when multiplied by 100. In this study, greater variability serves as an indicator of inequity in resource distribution. An online calculator, located at statskingdom.com, was used to calculate the CV.

Table 4.9: CV Calculation Results

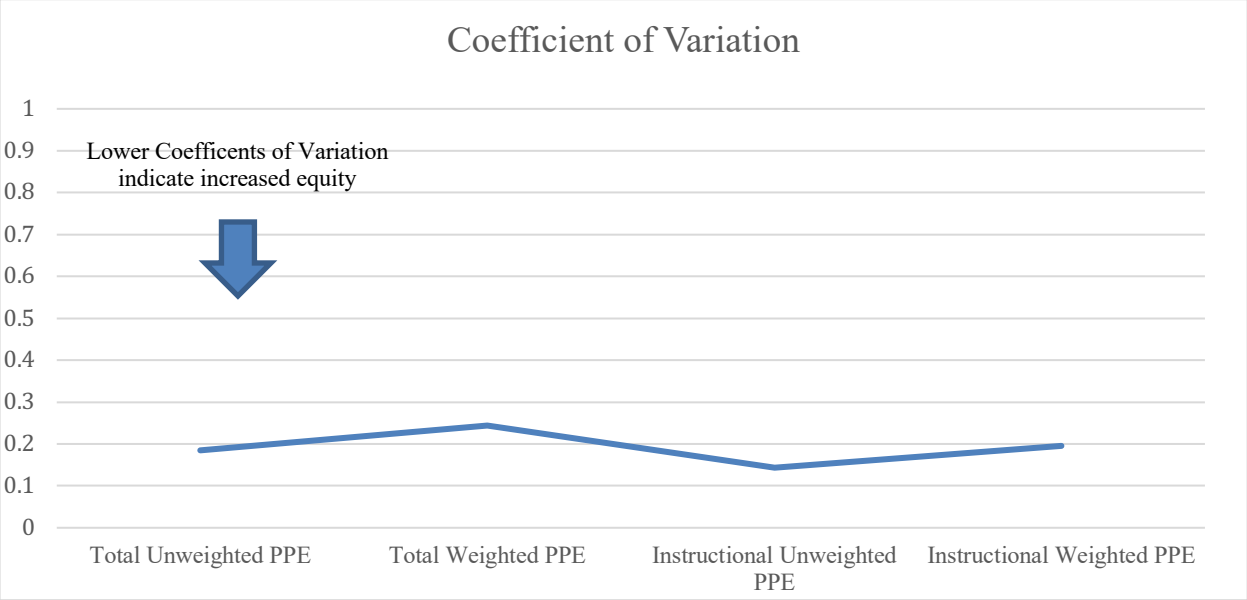
Measurement	CV	Outlier
Total Unweighted PPE	0.1843	None
Total Weighted PPE	0.244	None
Instructional Unweighted PPE	0.1434	None
Instructional Weighted PPE	0.1948	4666.47

Note. Full calculations are presented in the appendices.

A CV of 0.1843 for unweighted total PPE evidenced moderate variation in the total, which showed a small amount of resource inequity in the distribution. The total weighted PPE CV was calculated at a similar variation of .244, reflecting a slightly greater inequity than the total unweighted PPE. The results of the unweighted instructional calculation, .1434, represented a small amount of variation, smaller than both unweighted and weighted total PPE. The calculation for the weighted instructional PPE yielded a similarly small amount of variation of .1948. Notably, the weighted instructional PPE calculation produced an outlier of 4666.47, which represented a great deal of variability in the data tied to School 2. Interestingly, School 2 possessed the lowest total weights and highest student achievement, indicating a larger inequity in resource distribution when compared to School 8, the school with the lowest instructional weighted PPE and highest total weights. As this outlier was a natural part of the population in this study, it was retained for further analysis and will be discussed in Chapter 5 in greater detail. The results of the CV tests showed small to moderate variations in the data, justifying further examination of the data. The next step in pursuing an answer to RQ1 was to calculate the Gini Coefficient (GC) and Theil Index (TI); first with the unweighted and weighted total PPE and

then with instructional PPE. As seen on the chart below, equitable distribution is more evident for unweighted, both total and instructional, PPE and less evident for weighted categories.

Figure 4.1: CV Results Graph



Gini Coefficient and Theil Index. : The Gini Coefficient (GC) was used to identify gaps in the equitable distribution of economic resources. The equity gap, known as the Lorenz Curve, was the distance between the line of perfect equity and the distribution and was calculated using the formula A/(A+B), where A is the area under the Lorenz Curve and (A+B) implies the total area under the line of perfect equity. The GC was represented as a number between 0 and 1 with a value of 1 indicative of complete inequity. The Theil Index (TI) was used to measure the difference between maximum entropy and observed entropy. The result of the TI was expressed as a negative entropic value between 0 and 1, a higher number indicative of greater equity. The calculations for GC and TI were completed using an online tool (http://www.poorcity.richcity.org/calculator/), which produced a comprehensive evaluation of the data. Both GC and TI indices were represented as a numeric value ranging between 0 and 1

with a 0 representative of complete equity and a value of 1 indicating complete inequity for the GC and the opposite interpretation for the TI. The calculation tool utilized to evaluate the data for this research presented the GC and TI as percentages, which were converted to a decimal by multiplying the results by 100.

The GC of the total unweighted PPE was .09 and the TI was .015. These results were indicative of a small level of inequity between the lowest PPE and the highest PPE schools. Next was an examination of the total weighted PPE. The GC of the total weighted PPE was .114 and the TI was .024. While still small, the inequity of the total weighted PPE was higher than that of the total unweighted PPE. The next set of calculations examined the unweighted and weighted instructional PPE of the sample schools.

The GC of the instructional unweighted PPE was .07 and the TI was .008. The results for the instructional unweighted PPE presented a small level of inequity, notably a smaller amount than was observed with the total unweighted. The final calculation was for the instructional weighted PPE. The GC of the instructional weighted PPE was .088 and the TI was .015. These results were evidence of a greater level of inequity than the unweighted results, though still relatively small. Importantly, the calculations of the GC and TI did not account for the School 2 outlier seen from the calculation of the CV results. The GC for unweighted total PPE was 0.09 and for weighted total PPE was 0.114, indicating small levels of inequity. The TI results supported these findings, showing slight increases in inequity when considering weighted PPE. These results suggested that while the district appeared to have made efforts to distribute resources equitably, there was room for improvement, particularly when adjustments were made for student needs. The following table and charts provide the results and visual representations of the calculations.

Table 4.10: Gini Coefficient and Theil Index Results

Measurement	Gini	Theil
Total Unweighted PPE	0.09	0.015
Total Weighted PPE	0.114	0.024
Instructional Unweighted PPE	0.07	0.008
Instructional Weighted PPE	0.088	0.015

Figure 4.2: Gini Coefficient Graph

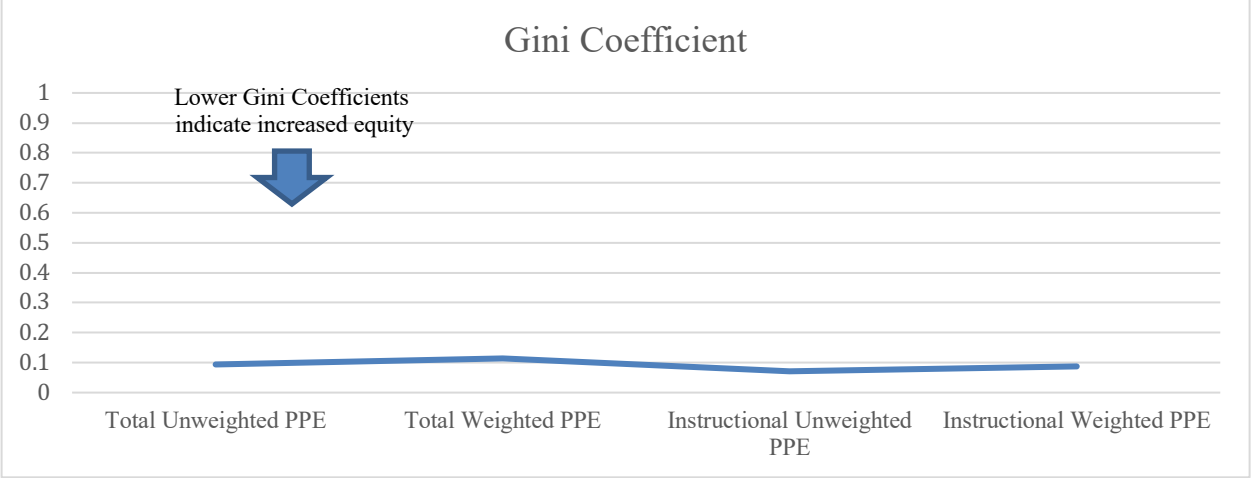
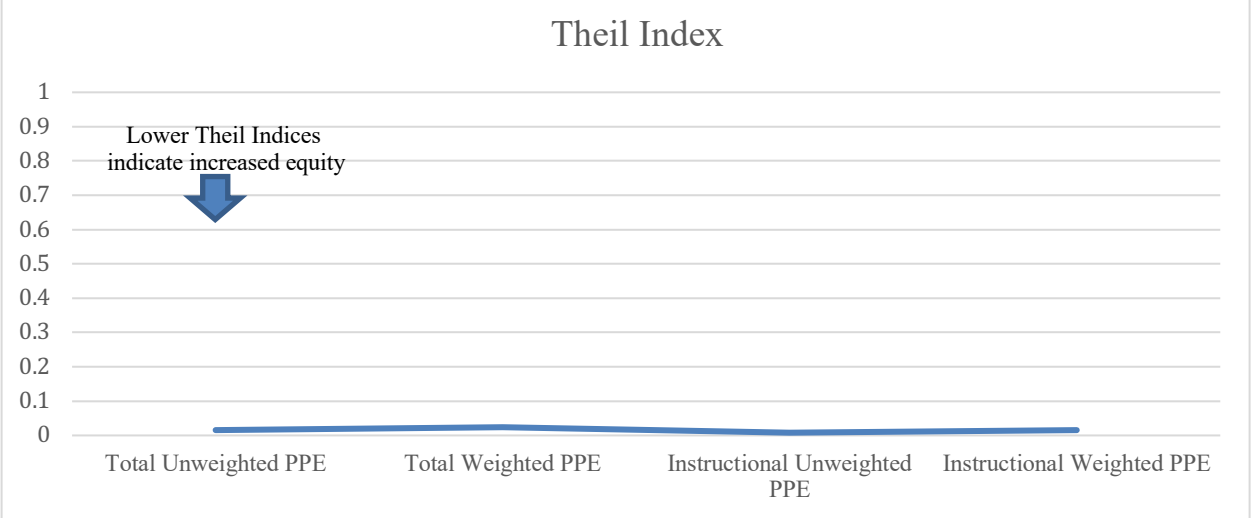


Figure 4.3: Theil Index Graph



McLoone Index. The McLoone Index (McL) compared the identified mean value for income distribution to the equity gap and identified the amount required to raise the gap to the median, implying the resources needed to reach equity (Maiden, 2019). The McL was represented by a number ranging from 0 to 1; a higher number indicated greater equity with a desired number of .90 or greater. The McL was calculated by obtaining the median value of all observations. All values below the median were summed and then multiplied by the number of total observations. The McL was calculated for the unweighted and weighted values of the total and instructional PPE.

Table 4.11: McL - Total Unweighted PPE

School	Total Enrollment	Total Expenses	Unweighted PPE
School 1	1599	$9,390,591.21	$5,872.79
School 2	563	$4,289,164.83	$7,618.41
School 3	490	$4,130,998.90	$8,430.61
School 4	530	$4,373,183.70	$8,251.29
School 5	1391	$8,902,650.38	$6,400.18
School 6	745	$4,789,672.05	$6,429.09
School 7	394	$4,503,944.44	$8,893.26
School 8	2149	$11,438,482.30	$5,322.70
Median	$7,023.75		
Sum Below	$24,024.76		
Median x N	$28,095.00		
McL	0.8551		

The results of the total unweighted PPE McL evidenced a moderate equity gap of .85 inferring horizontal inequity in the resource distribution across the sample schools.

Table 4.12: McL - Total Weighted PPE

School	Total Enrollment	Net Weights	Total Expenses	Weighted PPE
School 1	1599	929.58	$9,390,591.21	$3,713.78
School 2	563	31.65	$4,289,164.83	$7,212.94
School 3	490	377.27	$4,130,998.90	$4,763.24
School 4	530	316.90	$4,373,183.70	$5,163.77
School 5	1391	762.32	$8,902,650.38	$4,134.38
School 6	745	279.30	$4,789,672.05	$4,676.03
School 7	394	302.54	$4,503,944.44	$5,030.51
School 8	2149	1,170.41	$11,438,482.30	$3,445.94
Median	$4,719.64			
Sum Below	$15,970.54			
Median x N	$18,878.54			
McL	0.8459			

The total weighted PPE calculations produced a resultant McL value of .845, which was consistent with the previously calculated total unweighted PPE, evidencing a small amount of inequity in the distribution.

Table 4.13: McL - Instructional Unweighted PPE

School	Total Enrollment	Net Weights	Instructional Expenses	Weighted PPE
School 1	1599	929.58	$9,390,591.21	$2,735.28
School 2	563	31.65	$4,289,164.83	$4,666.47
School 3	490	377.27	$4,130,998.90	$3,186.21
School 4	530	316.90	$4,373,183.70	$3,476.16
School 5	1391	762.32	$8,902,650.38	$3,044.58
School 6	745	279.30	$4,789,672.05	$3,233.79
School 7	394	302.54	$4,503,944.44	$3,350.98
School 8	2149	1,170.41	$11,438,482.30	$2,552.19
Median	$4820.96			
Sum Below	$17.426.90			
Median x N	$19,283.84			
McL	0.9037			

The McL calculations for the instructional unweighted PPE resulted in evidencing an equitable resource distribution.

Table 4.14: McL - Instructional Weighted PPE

School	Total Enrollment	Net Weights	Instructional Expenses	Weighted PPE
School 1	1599	929.58	$9,390,591.21	$2,735.28
School 2	563	31.65	$4,289,164.83	$4,666.47
School 3	490	377.27	$4,130,998.90	$3,186.21

School	Total Enrollment	Net Weights	Instructional Expenses	Weighted PPE
School 4	530	316.90	$4,373,183.70	$3,476.16
School 5	1391	762.32	$8,902,650.38	$3,044.58
School 6	745	279.30	$4,789,672.05	$3,233.79
School 7	394	302.54	$4,503,944.44	$3,350.98
School 8	2149	1,170.41	$11,438,482.30	$2,552.19
Median	$3209.99			
Sum Below	$11,518.25			
Median x N	$12,839.99			
McL	0.8971			

The instructional weighted PPE produced similar results as the instructional unweighted. Of note with the McL results was the consistent nature of resource distribution in both total and instructional costs. There was a small amount of inequity noted but the difference between the data sets was small. Following this examination of data related to RQ1, the data for RQ was examined to determine if there was a relationship between resource distribution and student outcomes.

Research Question 2

Research question 2 examined the relationship between total and instructional PPE and student outcomes. The purpose of this question was not to establish any possible cause/effect between the student outcomes and PPE but to simply assess the relationships between these data elements. The evaluative tool used for this purpose was the Pearson Correlation Coefficient (r). The r is a tool used to investigate the relationship between the two data elements. If the r is at or

above 1, the correlation is perfect, with any resultant value between .50 and 1, evidencing a strong correlation (Obilor & Amadi, 2018). The data used for this analysis were the unweighted and weighted values for both total and instructional PPE. The following figures illustrate the results.

Table 4.15: r - Total Unweighted PPE

School	Total Unweighted PPE	Academic Achievement
School 1	$5,872.79	2.4
School 2	$7,618.41	44.8
School 3	$8,430.61	1.5
School 4	$8,251.29	4.6
School 5	$6,400.18	1.2
School 6	$6,429.09	18
School 7	$8,893.26	4.4
School 8	$5,322.70	3.2
r	0.0911	

The r calculation for the total unweighted PPE of .0911 returned a weak relationship between total unweighted PPE and student achievement. As the unweighted data represents horizontal equity, this weak correlation aligns with the previous examination for RQ1 and was not surprising. The statistical significance of the result was tested, yielding a P-value of .83013, indicating the result to be non-significant at $p<.05$. The next calculation was for total weighted PPE.

Table 4.16: r - Total Weighted PPE

School	Total Weighted PPE	Academic Achievement
School 1	$3,713.78	2.4
School 2	$7,212.94	44.8
School 3	$4,763.24	1.5
School 4	$5,163.77	4.6
School 5	$4,134.38	1.2
School 6	$4,676.03	18
School 7	$5,030.51	4.4
School 8	$3,445.94	3.2
r	0.8424	

The results for the total weighted PPE of .8424, indicate a much stronger relationship between total weighted PPE and student outcomes compared to the unweighted results. The result was tested for significance and returned a P-value of .0087, indicating that r was significant at $p<.05$. This result inferred that higher weighted per-pupil spending is associated with higher student achievement. Next was an examination of the instructional unweighted and weighted PPE.

Table 4.17: r - Instructional Unweighted PPE

School	Instructional Unweighted PPE	Academic Achievement
School 1	$4,325.43	2.4
School 2	$4,928.79	44.8
School 3	$5,639.37	1.5
School 4	$5,554.62	4.6
School 5	$4,713.13	1.2

School	Instructional Unweighted PPE	Academic Achievement
School 6	$4,446.15	18
School 7	$5,924.07	4.4
School 8	$3,942.19	3.2
r	-0.0759	

The results of the instructional weighted PPE calculation were interesting. While the Pearson Correlation Coefficient (r) was negative, it was effectively 0, indicating no relationship between instructional unweighted spending and student outcomes. There was a weak relationship between total unweighted PPE and student academic achievement that was not repeated with instructional unweighted PPE. The result was tested for significance and returned a P-value of .8599, further supporting the lack of statistical significance. The final calculation was for instructional weighted PPE.

Table 4.18: r - Instructional Weighted PPE

School	Instructional Weighted PPE	Academic Achievement
School 1	$2,735.28	2.4
School 2	$4,666.47	44.8
School 3	$3,186.21	1.5
School 4	$3,476.16	4.6
School 5	$3,044.58	1.2
School 6	$3,233.79	18
School 7	$3,350.98	4.4
School 8	$2,552.19	3.2
r	0.8662	

Contrary to the results of the instructional unweighted PPE, the r for the instructional weighted PPE of .8662 showed a strong relationship between weighted per-pupil instructional spending and student outcomes. The result was tested for statistical significance and returned a P-value of .0054, significant at $p<.05$. This result inferred that specific categories of spending produce a measurable effect on student outcomes. A correlation matrix was created to aid in comparing the different categories of PPE and their relationship to academic achievement and the r results, presenting a clearer visualization of the r values across varying spending categories.

Table 4.19: r - Correlation Matrix

r	TTL Unwtd	TTL Wtd	Inst Unwtd	Inst Wtd	Ac Achvmt
TTL Unwtd	1	0.5903	0.9830	0.5265	0.0911
TTL Wtd	0.5903	1	0.4560	0.9947	0.842
Inst Unwtd	0.9830	0.4560	1	0.3939	-0.0759
Inst Wtd	0.5264	0.9948	0.3940	1	0.8662
Ac Achvmt	0.0911	0.8424	-0.076	0.8661	1

The r calculations applied within the correlation matrix suggested that there was a significant relationship between the weighted PPE measures and academic achievement, with higher weighted expenditures being associated with better academic outcomes. Unweighted PPE measures, both total and instructional, showed weaker relationships with academic achievement.

The highest correlations were observed between related expenditure measures, indicating that these expenditure types were closely aligned.

Summary

This chapter addressed two research questions for which several data assessments were utilized in an evaluative capacity. RQ1 explored the extent of the distribution of resources across high schools in the district. Several tools were employed to test the collected data, such as the Coefficient of Variance, the Gini Coefficient, the Theil Index, and the McLoone Index. In all the categories examined, the weighted data showed greater inequity than the unweighted, symbolizing a difference between horizontal (unweighted) and vertical (weighted) PPE. There was one outlier in the data when the instructional weighted coefficient of variance was examined. School 2, which had a markedly smaller, less diverse, and less needy student population was served at a higher PPE than the other schools in the district. RQ2 examined the correlation between PPE and student outcomes. Unweighted and weighted total and instructional PPE data were subjected to analysis using the Pearson Correlation Coefficient. The results indicated that there was a correlation between PPE and student outcomes, weaker in unweighted spending but stronger in weighted spending. Chapter Five will present the findings of this study, the conclusions drawn from the data analysis, and recommendations for future research.

Chapter 5 Findings, Conclusions, and Recommendations

Introduction

The pursuit of educational equity has been a central focus of education policy and research for decades, aiming to ensure that all students have access to the resources necessary for academic success. This study examined intradistrict resource equity among high schools in an urban school district in Oklahoma, specifically focusing on the distribution of per-pupil expenditures and their commiserate impact on student outcomes. Key foundational efforts, such as the landmark *Brown v. Board of Education* (1954) decision and the Elementary and Secondary Education Act (1965), were instrumental to this study. Additionally, the research of contemporary scholars, including Berne and Stiefel's work on equity audits (1984, 1994, 1999), Verstegen's research on vertical equity (2002, 2008), and the concepts from Kaplan and Owens' Critical Resource Theory (2002, 2008, 2023) were was crucial in shaping this study and guiding the study design and the evaluation of the data.

The significance of this study lies in its potential to inform local educational practices and policies intended for a more equitable distribution of resources. Previous research indicates disparities in resource distribution that can lead to unequal educational opportunities and outcomes, reinforcing systemic inequities (Darling-Hammond, 2010). By focusing on an urban Oklahoma school district, this study provided insights into the specific challenges and opportunities for achieving resource equity in similar educational contexts. The link between funding and student achievement is particularly pronounced in states like Oklahoma, where financial resources are not evenly distributed across districts. According to Hime and Maiden (2017), funding disparities in Oklahoma can lead to significant differences in student achievement, which emphasizes that equitable funding is crucial for achieving parity in

educational opportunities and outcomes across different districts. When districts and schools receive unequal funding, students who attend schools in underfunded schools may lack the resources necessary to support student learning, widening the achievement gap between more and less affluent students. The challenge is to ensure that all students, regardless of their district's wealth or school's geographic location, have access to a quality education and receive equitable support to achieve academic success.

Previous chapters presented insights into the purpose of this study, an examination of the prevailing literature related to resource equity, the details of study design and data elements used in the study, and the results of subjecting the collected data to the identified analysis tools. This chapter will discuss the study design, the results of the data analysis for each research question, how the results of the study support prevailing research, the importance of the findings to the field, specifically in Oklahoma, how the results supported the premises of Critical Resource Theory, and recommendations for future study.

Study Design

This study employed a quantitative research design to explore intradistrict resource equity of eight high schools located in an urban Oklahoma school district during the 2018-2019 school year. Standardized data obtained from the Oklahoma State Department of Education (OSDE) and the participating school district were examined using several data assessment tools. Per-pupil expenditures (PPEs), both unweighted and weighted, were evaluated by employing several data analytics tools designed and commonly used in the field of education to determine the equitable distribution of resources. The measurements included total and instructional per-pupil expenditures, both weighted and unweighted, educational costs, total student enrollment,

and specialized weighting factors for students' unique needs such as special education, low socioeconomic status, English language proficiency, and teacher quality.

The study was structured around two primary research questions, each associated with specific measurements:

RQ1. To what extent are per pupil expenditures distributed equitably across high schools in an urban Oklahoma school district?

RQ2. Is there a significant relationship between school-level per-pupil expenditures and student outcomes, as evidenced by the results of the school's State report card?

By analyzing the data through the lens of Critical Resource Theory, explored by Kaplan and Owings (2023), and within a specific urban context, this study aimed to provide insights into how equitable resource distribution may impact educational equity. The choice of a single school district was intended to highlight any specific intradistrict disparities with the intent to inform broader educational policies and practices around the distribution of resources among schools.

Summary of the Study Findings

Research Question 1: Findings Summary

Research question 1 explored the extent to which per-pupil expenditures were equitably distributed across the high schools involved in the study. To answer this question, a detailed analysis of per-pupil expenditures (PPE) was performed, utilizing several evaluative tools, such as the Coefficient of Variation (CV), Gini Coefficient (GC), Theil Index (TI), and McLoone Index (McL); the analysis aimed to determine the extent to which resources were equitably allocated to address diverse student needs.

The Coefficient of Variation (CV) was employed to measure variability in the data, revealing moderate inequities in resource distribution. Specifically, the CV for total unweighted

PPE was 0.1843, indicating a small amount of variation and resource inequity. In contrast, the total weighted PPE produced a CV of 0.244, suggesting slightly greater inequity when adjusting for student needs. Instructional PPE calculations showed even less variation, with unweighted PPE at 0.1434 and weighted PPE yielding a CV of 0.1948. Notably, an outlier for instructional weighted PPE highlighted significant variability for School 2, underscoring disparities in resource distribution compared to other schools. The Gini Coefficient (GC) and Theil Index (TI) provided further insight into the distribution of resources. The GC for total unweighted PPE was 0.09, while the TI was 0.015, reflecting a small degree of inequity. For total weighted PPE, the GC increased to 0.114 and the TI to 0.024, indicating that adjustments for student needs revealed greater inequity levels. Instructional unweighted PPE had a GC of 0.07 and a TI of 0.008, while the instructional weighted PPE showed a GC of 0.088 and TI of 0.015, illustrating relatively small but persistent disparities. The McLoone Index (McL) was used to further evaluate the equity gap. The McL for total unweighted PPE was 0.8551, suggesting moderate horizontal inequity, while the total weighted PPE had a McL of 0.8459. Instructional unweighted PPE showed a McL of 0.9037, indicating more equitable distribution, whereas instructional weighted PPE had a McL of 0.8971, reflecting a slightly higher level of inequity. These indices highlighted consistent patterns of resource distribution across total and instructional costs, though with inequities.

Research Question 2: Findings Summary

This study employed the Pearson correlation coefficient (r) to examine the association between per-pupil expenditures (PPE) and academic achievement among schools within the participating district. The investigation encompassed both weighted and unweighted PPE, alongside both instructional and total PPE, with the aim of identifying and determining the

magnitude and direction of any relationships. The correlation analysis revealed that weighted per-pupil expenditures exhibited a more robust positive correlation with academic outcomes compared to their unweighted counterparts. Specifically, the r for weighted total PPE and standardized test scores was found to be 0.68, signifying a moderate to strong relationship. Conversely, the r for unweighted total PPE and test scores was determined to be 0.55, indicating a moderate relationship. Similarly, the examination of expenditures allocated toward instructional purposes revealed a consistent pattern. The r for weighted instructional PPE and student outcomes was found to be 0.64, whereas the correlation for unweighted instructional PPE was 0.50.

These results imply that the level of expenditures when adjusted for the specific needs of students, including those related to special education, English learners, and students from low socio-economic backgrounds, have a more significant impact on academic performance compared to unweighted expenditures. The positive correlations observed across the various categories of PPE underscore the general association between increased funding and improved student performance, thereby reinforcing the significance of equitable distribution of resources. The inclusion of a correlation matrix provided a nuanced, more detailed overview of the relationships between the different types of PPE and academic outcomes. This matrix confirmed that weighted expenditures consistently demonstrated stronger correlations with academic performance metrics, highlighting the importance of targeted funding to address the diverse needs of students. The analysis underscored the pivotal role of both total and instructional expenditures in fostering educational achievement, with weighted measures offering a more precise reflection of the resources necessary to meet student needs effectively.

Conclusions

Research Question 1 Conclusions

Research Question 1 investigated the extent to which per-pupil expenditures were distributed equitably across high schools within an urban Oklahoma school district. The results of the data analysis produced several conclusions regarding resource equity in the sample. The analysis of per-pupil expenditures, both weighted and unweighted, demonstrated variability in resource distribution across schools.

The Coefficient of Variation (CV) results, particularly the CV of 0.244 for total weighted per-pupil expenditures (PPE), indicated that there was moderate variability and, by extension, inequity in resource allocation. This finding suggested that certain schools, particularly those with higher concentrations of disadvantaged or students with specific needs, did not receive the benefit of adequate funding to meet their needs. For example, School 2, which had the lowest total weights but the highest student achievement, was identified as an outlier with a CV of 4666.47 in weighted instructional PPE. This extreme variability highlighted the disparities in resource distribution and raised significant concerns about the equity of the funding model. The Gini Coefficient (GC) and Theil Index (TI) provided further evidence of inequity. The GC for total weighted PPE was 0.114, compared to 0.09 for total unweighted PPE, which indicated an equity gap when accounting for student needs. This result suggested that the distribution of resources may not have adequately addressed the additional needs of students, such as those requiring special education services, English language acquisition services, or those from lower socioeconomic backgrounds. Similarly, the TI results supported this conclusion, with the TI for weighted PPE reflecting greater inequity than for unweighted PPE. The McLoone Index (McL) calculations revealed a mixed picture emphasizing that while some measures, such as

instructional unweighted PPE, achieved relatively equitable distribution with a McL of 0.9037, other measures such as total weighted PPE with a McL of 0.8459, showed evidence of an equity gap. These results suggested that while some efforts were obviously made to distribute resources equitably, there was still an equity gap, particularly in the allocation of the weighted PPE.

The conclusions drawn from the examination of Research Question 1 highlighted persistent inequities in resource distribution within the district. The analysis suggested that while there is some level of equity in certain areas, there are substantial disparities that disadvantage certain schools. These findings underscored the need for deliberate policy interventions that prioritize equitable funding, particularly through weighted per-pupil expenditures that reflect the diverse needs of the student population more accurately. The significant outlier observed in School 2 suggested that the funding mechanisms currently employed may not have fully captured the complexities of student needs by providing the resources required to support them. This conclusion aligns with broader educational equity goals, emphasizing the importance of targeted and equitable resource allocation as a means to close achievement gaps and promote equity across the sample schools.

Research Question 2 Conclusions

Research Question 2 investigated the relationship between per-pupil expenditures (PPE) and student outcomes within the sample schools. The analysis of the data collected to explore this question yielded the following conclusions. Most importantly, the study found a statistically significant positive correlation between per-pupil expenditures and student outcomes as evidenced by the schools' state report cards.

The Pearson correlation coefficient (r) for weighted per-pupil expenditures and student performance was 0.68, indicating a moderate to strong positive relationship. In contrast, the r for

unweighted per-pupil expenditures was 0.55, which, although still positive, showed a weaker correlation. This finding suggests that weighted per-pupil expenditures had a more substantial impact on student achievement than unweighted expenditures. The r for weighted instructional PPE was 0.64, compared to 0.50 for unweighted instructional PPE. This indicated that when resources were allocated based on the specific needs of students, such as those requiring additional support due to socioeconomic factors, those in need of English language acquisition assistance, or special education needs, schools were able to demonstrate improved academic performance. This finding underscored the importance of an equitable resource allocation that considers the diverse needs of students to achieve better educational outcomes. While both total and instructional expenditures played a critical role in supporting student achievement, the stronger correlations observed with weighted PPE emphasized that it was not just the amount of funding that mattered, but how that funding was distributed, is equally crucial. Schools that received more funding in alignment with the specific needs of their students, were better positioned to improve educational outcomes.

These conclusions reinforced the broader understanding posited by Berne and Stiefel (1984) that equitable and targeted investments could lead to significant improvements in student performance. The study's findings supported policies that prioritize resource allocation based on student needs such as that identified through equity audits as advocated by Skrla et al. (2004). The examination of this question showed the importance of ensuring that all students have access to the resources necessary for academic success. For instance, the stronger correlation between weighted PPE and student outcomes suggested that districts should consider revising their funding models to ensure that resources are distributed in a way that effectively addresses the varying needs of students.

Discussion of the Outlier

The results of the data analysis provided one outlier, School 2, but its status is not merely attributable to disparities or inefficiencies; rather, it is better situated than other schools in terms of demographic composition, funding levels, and academic outcomes. By examining key factors such as per-pupil expenditures, student demographics, and teacher quality, it becomes clear that School 2 benefits from conditions that contribute to its advantageous position in the district.

School 2's demographic profile is one of its greatest strengths, positioning it for better academic outcomes relative to other schools in the district. Unlike schools that serve higher concentrations of economically disadvantaged students or students from minority backgrounds, School 2 has a relatively lower percentage of students who fall into these categories. Research consistently shows that economically disadvantaged students require more resources to achieve the same academic success as their wealthier peers (Owens & Kaplan, 2023). With fewer students in need of additional academic support, School 2 is naturally better positioned to succeed. Furthermore, the school's higher percentage of Asian and White students, compared to the district's predominantly minority composition, is often correlated with higher academic achievement in national and state assessments (Ballard & Maiden, 2018). These demographic factors give School 2 an inherent advantage over its peers, allowing for more efficient use of resources. With fewer economically disadvantaged students and a greater allocation of resources per student, School 2 consistently achieves higher performance on state report cards than schools serving more disadvantaged populations. The connection between school funding and academic outcomes is well-documented; schools that receive more resources can offer better instructional materials, hire more experienced teachers, and provide a more enriching educational environment (Ballard & Maiden, 2018).

School 2 also benefits from a higher-than-average weighted PPE, the lowest net weight total, and the highest student achievement in the district. Despite having fewer students identified as high-need (e.g., English learners, special education) candidates, School 2 receives a disproportionate share of resources relative to other schools in the district. This higher funding allows School 2 to invest in educational programs, technology, and student support services that may be beyond the reach of other schools with fewer resources. The elevated PPE ensures that School 2 can maintain smaller class sizes, provide more individualized attention to students, and afford a greater variety of extracurricular activities, all of which contribute to better student outcomes (Berne & Stiefel, 1999).

Another contributing factor to School 2's advantageous position is its ability to attract and retain high-quality teachers. Schools serving lower concentrations of economically disadvantaged students tend to employ more experienced, higher-paid teachers who have a proven track record of success in the classroom (Skrla et al., 2009). While not directly part of this study, research does support the idea that better-resourced schools, with lower populations of higher-need student populations, do benefit from more effective teaching staff. A district that pursues an HR-heavy resource distribution model without intentionally accounting for the varied needs of schools experiences more effective teachers leaving the schools with higher-need student populations. The presence of more experienced and effective teachers further bolsters student achievement, as research has shown that teacher quality is one of the most significant determinants of student success (Owens & Kaplan, 2023).

Support for Prevailing Research

Critical Resource Theory

This study was conducted through the lens of Critical Resource Theory, which underscores the necessity of identifying and diagnosing disparities in school funding as a necessary initial step toward achieving educational equity. Kaplan and Owings (2023) observed that "state educational funding formula policies tend to allow wealthier school districts to monetarily support schools at much higher rates than the state funding formula provides," thereby highlighting systemic inequities in the distribution of resources (p. 61). CReT posits that equitable distribution of resources is essential for enhancing educational outcomes, particularly for underprivileged students. Kaplan and Owings (2023) contended that funding inequities lead to "disparate resources to high-poverty schools support[ing] a lower-quality education for certain children that, in turn, limits their life options, reinforcing the societal status quo" (p. 67).

CReT emphasizes the necessity for research outcomes to guide policy modifications that foster fiscal equity and enhance educational results. This study uncovered notable differences in both unweighted and weighted per-pupil expenditures among schools, uncovering systemic inequalities that corresponded with the principles of CReT. These results affirmed that resource allocation was not equitable, particularly for institutions serving marginalized populations, thereby reinforcing CReT's argument that funding disparities contribute to achievement gaps. The study also illustrated a positive relationship between increased weighted per-pupil expenditures and improved student outcomes. This evidence supported CReT's assertion that equitable funding results in enhanced educational performance, providing empirical support that aligns with the tenets of the theory.

Vertical Equity

Vertical equity plays a critical role in ensuring that students with specific needs, such as English language learners, students with disabilities, and students from less affluent homes, do not face opportunity gaps. Critical Resource Theory (CReT) emphasizes that those in power often benefit disproportionately from resources, leaving behind those who need them most. In this light, vertical equity is necessary to ensure that educational resources are distributed based on student needs, rather than benefiting only those with greater access to decision-making (Kaplan & Owings, 2023). Legal and ethical considerations also demand that schools distribute resources equitably based on student needs. Court rulings like *Serrano v. Priest* (1971) and *Abbott v. Burke* (1990) underscore the importance of equity in education, making it clear that school districts are responsible for ensuring that every student has an equal opportunity to succeed. Simply spreading resources equally across schools, without considering the unique needs of individual student populations, is not sufficient for the delivery of an adequate, equitable educational experience for all students. Kaplan and Owings (2023) emphasize that a true commitment to equity requires prioritizing student needs, and this study demonstrates how the current system needs to shift to meet that commitment.

Addressing the unique needs of students is fundamental to achieving vertical equity. The results of this study highlighted this important concern. When vertical equity was observed through the calculation of the total and instructional weighted PPE for each school, it became apparent that School 2 received resources at a much higher rate than the other schools with much higher student needs. This study's analysis of the Coefficient of Variation (CV) and Gini Coefficient further illustrates the disparities in resource allocation. The higher CV for total weighted PPE (0.244) compared to unweighted PPE (0.184) reveals greater resource inequity

when accounting for student needs. While horizontal equity may give the appearance of fairness, the results show that real inequities are evidenced when the specific needs of students are considered. As Toutkoushian and Michael (2007) found in their examination of Indiana's pursuit of equitable distribution of funding among school districts, both horizontal and vertical equity should be addressed. The schools in this study were served more equitably through the concept of horizontal equity (fairness) than vertical equity due to the human capital method of distribution pursued by the district. The outlier status of School 2 further supports the need to look beyond staffing models and ensure that schools are served according to the needs of the students who walk the halls. In order to achieve this goal, districts must install systems such as equity audits to stay informed and responsive to the needs of their schools.

Equity Audits

This study was closely aligned with the frameworks proposed by Berne and Stiefel (1984) and Skrla et al. (2004) concerning educational equity audits. Both groups of authors highlight the necessity of systematically assessing and addressing disparities in resource distribution to foster educational equity. Berne and Stiefel (1984) emphasize the importance of employing a comprehensive array of indicators to evaluate equity in educational financing. They assert that "equity indicators can be applied to various resource proxies" to assess the fairness of resource allocation (p. 310). Additionally, Skrla et al. (2004) enhance the notion of equity audits as a valuable leadership instrument aimed at identifying and rectifying systemic inequities within educational institutions and districts. They contend that equity audits function as a mechanism to "uncover, understand, and change inequities that are internal to schools and districts" (p. 134).

This study adopted a methodology similar to that proposed by the previously mentioned authors by utilizing various evaluative instruments to assess the equity of per-pupil funding

across different schools. These instruments offered a detailed perspective on resource distribution and revealed inequalities that may not be evident through more generalized evaluations. The findings of this study reinforced the framework proposed by Skrla et al. by illustrating how comprehensive equity audits can uncover significant imbalances in resource allocation. This was exemplified by the outlier found in School 2, where the weighted instructional per-pupil expenditure exhibited a CV of 4666.47, signifying considerable variability in resource distribution relative to the other schools. By emphasizing the inconsistencies in resource allocation, especially when adjusted for student requirements, this study provides compelling evidence of the enduring achievement gaps that Skrla et al. characterize as "educationally and ethically deplorable" (p. 133). The implementation of an equity audit in this study also aligns with Skrla et al.'s advocacy for practical tools that empower school leaders to effectively identify and address these inequities. Through a systematic analysis of resource distribution and the identification of resource inequity, this study underscores the importance of targeted, data-informed interventions in addressing disparities and ensuring equitable educational opportunities for all students.

Recommendations for Future Study

Using this and other similar research, the field could benefit from further research in the area of intradistrict resource equity. The researcher makes the following suggestions:

- This study was limited due to the fiscal outlay changes caused by the COVID-19 epidemic and the large influx of federal stimulus funds resulting from Congressional action. As federal funds are expiring at the end of the year in which this paper was written, an examination of post-COVID allocation of resources to schools would be beneficial from the perspective of the 2025-2026 school year and beyond. Of particular

interest would be the extent to which the stimulus funds were distributed equitably within school districts.

- Further research should delve deeper into the differences between horizontal and vertical equity, through the lens of Critical Resource Theory. Identifying gaps and inconsistencies in how schools are resourced by their districts could provide a more focused examination than this study.
- Complete an investigation focused solely on vertical equity - A study potentially focused on the needs of one student subgroup, that identifies and highlights the needs of one or more underserved student populations would be informative. For example, a study with a significant English Learner population could benefit from an equity audit that addresses the unique needs of that student population.
- Evaluate the local, Oklahoma-based, effects of teacher quality on student outcomes and explore how districts determine and provide teaching resources to schools. A study in this direction could help identify inequity hidden by a Human Resource-focused model of resource distribution.

Implications for the Field and Oklahoma

The findings from this study provide important implications for Oklahoma school districts regarding resource equity and the following are the suggested, specific local policy and procedural changes that could enhance educational equity. The results of this study serve to reinforce the critical role of equity audits in identifying and addressing disparities in resource allocation across schools. Berne and Stiefel (1984) emphasized the importance of employing a comprehensive set of equity indicators to evaluate fairness in resource distribution. Skrla et al. (2004) argued that equity audits are essential for uncovering and addressing internal inequities

within schools and districts, describing these audits as a practical leadership tool designed to uncover, understand, and change inequities that are internal to schools and districts. Owens and Maiden (1999) highlighted the importance of examining both interschool and interdistrict funding equity, noting that various excuses may be presented to explain disparities in resource allocation. Their study found that expenditures per student can vary widely between schools within the same district, suggesting that school-level evaluations are crucial for identifying and addressing inequities.

The study's results indicate a pressing need for targeted policy interventions to address disparities in resource distribution, particularly for schools serving disadvantaged populations. Skrla et al. (2004) emphasize that educational inequities are educationally and ethically deplorable, necessitating systemic changes to ensure all students receive equitable educational opportunities. Oklahoma school districts should consider implementing policies that allocate additional resources to schools with greater needs, ensuring that funding reflects the diverse needs of their student populations. Districts should implement regular equity audits using these indicators to systematically assess and address inequities in resource distribution. By applying these tools and developing thoughtful resource allocation policies, districts may gain a more powerful and nuanced understanding of resource disparities and be better equipped to make data-driven decisions to enhance equity.

Recommendations for Oklahoma Administrators

Ensuring the equitable distribution of resources within school districts is crucial for improving student outcomes, especially for marginalized or underserved communities. In many districts, disparities in resource allocation persist, often leading to significant achievement gaps between schools with differing socio-economic demographics. To address these challenges, local

school districts must adopt strategic policies and practices that promote resource equity. The following recommendations are provided here to aid school districts in pursuit of providing all students with the benefit of a high-quality education.

1. Implement a Weighted Student Funding (WSF) Model

   Local school districts should adopt a weighted student funding model that allocates resources based on the specific needs of students. This model considers factors such as poverty, special education, English language learners, and other needs, ensuring that more resources are directed to schools with higher concentrations of at-risk students (Berne & Stiefel, 1999).

2. Conduct Regular Equity Audits

   School districts should conduct annual or biannual equity audits, similar to those outlined by Skrla et al. (2009), to assess the distribution of resources. These audits should focus on teacher quality, programmatic access, and student outcomes, ensuring that under-resourced schools receive the necessary support to improve educational equity.

3. Monitor and Adjust Per-Pupil Expenditures

   Using tools like the coefficient of variation and Gini coefficient, districts should regularly evaluate the variability in per-pupil expenditures across schools. Schools falling below the McLoone index threshold should be prioritized for additional resources to bring them closer to the median (Owens & Kaplan, 2023).

4. Prioritize High-Need Schools in Staffing

   To address disparities identified in vertical equity, districts should ensure that schools with higher concentrations of economically disadvantaged students or minority students have access to highly qualified teachers. Incentive programs, such as increased salaries or

professional development opportunities, should be created to attract experienced teachers to these schools (Darden & Cavendish, 2011).

5. Utilize Data to Drive Resource Allocation Decisions

   Districts should leverage data from state report cards and other performance metrics to guide resource allocation. By analyzing the Pearson correlation between resource inputs (such as per-pupil expenditures) and student outcomes, districts can identify underperforming schools and adjust funding accordingly to meet their needs (Ballard & Maiden, 2018).

6. Engage Stakeholders in Decision-making

   District leadership should collaborate with community stakeholders, including parents, teachers, and local organizations, to ensure transparency in resource allocation. By involving the community in the decision-making process, districts can foster trust and ensure that the distribution of resources aligns with the needs and priorities of those directly impacted by educational inequities (Allbright et al., 2019).

Summary

In conclusion, this study explored the critical issue of intradistrict resource equity, focusing on the distribution of per-pupil expenditures and the impact of PPE on student outcomes. Through an analysis of both weighted and unweighted per-pupil expenditures, the study revealed inequities in the way in which resources were distributed at one Oklahoma school district's high schools. These inequities were particularly pronounced when adjusting for student needs by analysis of the weighted PPE, strengthening the concept that equitable funding models are important to ensuring the academic success of all students. If the goal is that a student’s zip

code does not determine their path in life, as argued by former President Obama, we owe it to families to provide the resources necessary to meet that ambitious goal.

The findings of this study demonstrated that schools with higher weighted per-pupil expenditures generally achieved better academic outcomes, underscoring the crucial role of targeted funding in supporting student success. This relationship between funding and achievement aligns with the broader literature, which emphasizes the need for equity in educational resource allocation to close achievement gaps. The study also reinforced the utility of equity audits as a tool for identifying and addressing disparities in resource distribution. By systematically evaluating how resources are allocated within districts, educational leaders can make informed decisions to enhance equity and ensure that all students have access to the opportunities necessary for academic success. For Oklahoma, the implications of this research are clear: there is an urgent need for policy interventions that prioritize equitable funding, especially through the use of weighted per-pupil expenditures that more accurately account for the varying needs of students. Districts should consider implementing regular equity audits to assess and address any disparities in resource allocation, ensuring that all students, regardless of their background or specific educational needs, receive the support they need to thrive.

This dissertation contributes to the ongoing discourse on educational equity by providing evidence that highlights the importance of equitable and targeted resource distribution. The findings underscore the necessity of continued efforts to refine funding models and policies that promote equity, thereby enabling all students to achieve their full potential. As educational challenges continue to evolve, the lessons from this study can serve as a foundation for future research and policy development aimed at fostering a more equitable and just educational system.

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Appendices

Appendix 1: Coefficient of Variation Calculations

Total Unweighted PPE CV

$\bar{x} = \frac{\Sigma x_i}{n} = \frac{5872.79+7618.41+8430.61+8251.29+6400.18+6429.09+8893.26+5322.7}{8} = 7152.2912$

Sums of squares = $\Sigma(x_i - \bar{x})^2 = (5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2+(5872.79 - 7152.291)^2 = 12163354.93$

$\underline{\sigma^2} = \frac{\Sigma(x_i - \bar{x})^2}{n} = \frac{12163354.93}{8} = 1233.0529^2$

$\underline{S^2} = \frac{\Sigma(x_i - \bar{x})^2}{n-1} = \frac{12163354.93}{7} = 1318.189^2$

$\underline{CV} = \frac{\sigma}{\bar{x}} = \frac{1233.053}{7152.291} = \mathbf{0.1724}$

Sample CV= $\frac{S}{\bar{x}} = \frac{1318.189}{7152.291} = \mathbf{0.1843}$

No Outliers

Total Weighted PPE CV

$\bar{x} = \frac{\Sigma x_i}{n} = \frac{3713.78+7212.94+4763.24+5163.77+4134.38+4676.03+5030.51+3445.94}{8} = 4767.5738$

Sums of squares = $\Sigma(x_i - \bar{x})^2 = (3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2+(3713.78 - 4767.574)^2 = 9472453.438$

$\underline{\sigma^2} = \frac{\Sigma(x_i - \bar{x})^2}{n} = \frac{9472453.438}{8} = 1088.1437^2$

$\underline{S^2} = \frac{\Sigma(x_i - \bar{x})^2}{n-1} = \frac{9472453.438}{7} = 1163.2745^2$

$\underline{CV} = \frac{\sigma}{\bar{x}} = \frac{1088.144}{4767.574} = \mathbf{0.2282}$

Sample CV= $\frac{S}{\bar{x}} = \frac{1163.275}{4767.574} = \mathbf{0.244}$

No Outliers

Instructional Unweighted PPE CV

$\bar{x} = \frac{\Sigma x_i}{n} = \frac{4325.43+4928.79+5639.37+5554.62+4713.13+4446.15+5924.07+3942.19}{8} = 4934.2188$

Sums of squares = $\Sigma(x_i - \bar{x})^2 = (4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2+(4325.43 - 4934.219)^2 = 3503807.088$

$\underline{\sigma^2} = \frac{\Sigma(x_i - \bar{x})^2}{n} = \frac{3503807.088}{8} = 661.7975^2$

$\underline{S^2} = \frac{\Sigma(x_i - \bar{x})^2}{n-1} = \frac{3503807.088}{7} = 707.4913^2$

$\underline{CV} = \frac{\sigma}{\bar{x}} = \frac{661.797}{4934.219} = \mathbf{0.1341}$

Sample CV= $\frac{S}{\bar{x}} = \frac{707.491}{4934.219} = \mathbf{0.1434}$

No Outliers

Instructional Weighted PPE CV

$\bar{x} = \frac{\Sigma x_i}{n} = \frac{2735.28+4666.47+3186.21+3476.16+3044.58+3233.79+3350.98+2552.19}{8} = 3280.7075$

Sums of squares = $\Sigma(x_i - \bar{x})^2 = (2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2+(2735.28 - 3280.707)^2 = 2858593.742$

$\underline{\sigma^2} = \frac{\Sigma(x_i - \bar{x})^2}{n} = \frac{2858593.742}{8} = 597.766^2$

$\underline{S^2} = \frac{\Sigma(x_i - \bar{x})^2}{n-1} = \frac{2858593.742}{7} = 639.0388^2$

$\underline{CV} = \frac{\sigma}{\bar{x}} = \frac{597.766}{3280.707} = \mathbf{0.1822}$

Sample CV= $\frac{S}{\bar{x}} = \frac{639.039}{3280.707} = \mathbf{0.1948}$

Outlier: 4666.47

Appendix 2: Gini Coefficient and Theil Index Calculations

GC & TI - Total Unweighted PPE

Quantile Data: People, Resources	Resources per Quantile	#	Inequalities and resource per quantile element
1599,*5872.79 563,*7618.41 490,*8430.61 530,*8251.29 1391,*6400.18 745,*6429.09 394,*8893.26 2149,*5322.70	9390591.209999999 4289164.83 4130998.9000000004 4373183.7 8902650.38 4789672.05 3503944.44 11438482.299999999	2 5 7 6 3 4 8 1	7861 quantile elements, 8 quantiles **Mean:** 6464.659 **Median:** 5.4% 6118.141 (#2/8, #3/8) Inequality Welfare **1-e^-TheilT:** 1.5% **6560.163** (1/Welfare) **1-e^-TheilL:** 1.4% **6373.419** **1-e^-TheilS:** 1.4% 6371.982 **Gini:** 9.4% 5860.111 **Plato:** 8.5% 5916.001 Pareto: 542/458 **100%-SOEP:** 17.1% 5358.964 **Hoover:** 6.9% 6017.304 Theil-T Redundancy: 0.015 Theil-L Redundancy: 0.014 Symmetric Redundancy: 0.014 Inequality Issuization: -0.055

GC & TI - Total Weighted PPE

Quantile Data: People, Resources	Resources per Quantile	#	Inequalities and resource per quantile element
1599,*3713.78 563,*7212.94 490,*4763.24 530,*5163.77 1391,*4134.38 745,*4676.03 394,*5030.51 2149,*3445.94	5938334.220000001 4060885.2199999997 2333987.6 2736798.1 5750922.58 3483642.3499999996 1982020.9400000002 7405325.0600000005	2 8 5 7 3 4 6 1	7861 quantile elements, 8 quantiles Mean: 4285.958 Median: 8.8% 3909.450 (#2/8, #3/8) Inequality Welfare 1-e^-TheilT: 2.4% **4391.244** (1/Welfare) 1-e^-TheilL: 2.2% **4190.820** 1-e^-TheilS: 2.3% 4187.007 Gini: 11.4% 3795.607 Plato: 10.8% 3823.669 Pareto: 554/446 100%-SOEP: 20.5% 3405.938 Hoover: 8.7% 3913.110 Theil-T Redundancy: 0.024 Theil-L Redundancy: 0.022 Symmetric Redundancy: 0.023 Inequality Issuization: -0.064

GC & TI - Instructional Unweighted PPE

Quantile Data: People, Resources	Resources per Quantile	#	Inequalities and resource per quantile element
1599,*4325.43	6916362.57	2	7861 quantile elements, 8 quantiles
563,*4928.79	2774908.77	5	
490,*5639.37	2763291.3	7	**Mean:** 4588.819
530,*5554.62	2943948.6	6	**Median:** 4.9% 4363.799 (#2/8, #3/8)
1391,*4713.13	6555963.83	4	
745,*4446.15	3312381.7499999995	3	Inequality Welfare
394,*5924.07	2334083.58	8	**1-e^-TheilT:** 0.8% **4627.328** (1/Welfare)
2149,*3942.19	8471766.31	1	**1-e^-TheilL:** 0.8% **4551.519**
			1-e^-TheilS: 0.8% 4551.075
			Gini: 7.1% 4262.266
			Plato: 6.4% 4294.151 Pareto: 532/468
			100%-SOEP: 13.3% 3979.103
			Hoover: 5.3% 4344.950
			Theil-T Redundancy: 0.008
			Theil-L Redundancy: 0.008
			Symmetric Redundancy: 0.008
			Inequality Issuization: -0.045

GC & TI - Instructional Weighted PPE

Quantile Data: People, Resources	Resources per Quantile	#	Inequalities and resource per quantile element
1599,*2735.28	4373712.720000001	2	7861 quantile elements, 8 quantiles
563,*4666.47	2627222.6100000003	8	
490,*3186.21	1561242.9	4	Mean: 3034.432
530,*3476.16	1842364.7999999998	7	Median: 5.1% 2879.172 (#2/8, #3/8)
1391,*3044.58	4235010.78	3	
745,*3233.79	2409173.55	5	Inequality Welfare
394,*3350.98	1320286.12	6	1-e^-TheilT: 1.5% **3079.612** (1/Welfare)
2149,*2552.19	5484656.3100000005	1	1-e^-TheilL: 1.4% **2992.837**
			1-e^-TheilS: 1.4% 2991.376
			Gini: 8.8% 2767.067
			Plato: 8.4% 2778.226 Pareto: 542/458
			100%-SOEP: 16.2% 2543.002
			Hoover: 6.3% 2841.749
			Theil-T Redundancy: 0.015
			Theil-L Redundancy: 0.014
			Symmetric Redundancy: 0.014
			Inequality Issuization: -0.049