LOCAL FUNDING PERCENTAGES AS A PREDICTOR OF SEVENTH GRADE STUDENT SUCCESS ON THE MISSOURI ASSESSMENT PROGRAM IN MATHEMATICS

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of the Requirements for the Degree

Doctor of Education

by

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May 2022
LOCAL FUNDING AND STUDENT SUCCESS

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

LOCAL FUNDING PERCENTAGES AS A PREDICTOR OF SEVENTH GRADE STUDENT SUCCESS ON THE MISSOURI ASSESSMENT PROGRAM IN MATHEMATICS

presented by Ethan Sickels,

a candidate for the degree of Doctor of Education,

and hereby certify that, in their opinion, it is worthy of acceptance.

___________________________________________

Dr. Timothy J. Wall

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Dr. Nissa Ingraham

___________________________________________

Dr. Bruce Johnson

___________________________________________

Dr. John Rinehart
DEDICATION

This dissertation is dedicated to my mother, Dianna Sickels. While she has faced numerous challenges throughout her life, including many before I was brought into this world, she has always handled them with grace and a smile on her face. Hopefully I have inherited some of her wonderful qualities and grown up to be a son of whom she can be proud. I express my sincere thanks and love to her for everything she has worked for and sacrificed, allowing me to pursue my goals and dreams for the past 45 years.

This dissertation is also dedicated to my father, Gary Sickels, who passed away in 2008. While academics were not high on his list, he always wanted me to achieve more. Although he would have struggled to express it in person, I am sure he is proud of what I have accomplished. I have no doubt he is somewhere telling lots of stories, including explaining to anyone who will listen how his “son’s a doctor, but not a real doctor,” with a smile on his face.
ACKNOWLEDGMENTS

Thank you to my mom, Dianna, for continuing to be an absolute blessing in my life. She’s the reason I am here, and without her love and support it’s doubtful I would possess one university degree, let alone now earning my doctorate.

Thank you to my advisor, Dr. Tim Wall. When we met twenty years ago in master’s degree classes, who would have guessed our paths would cross again in this manner. I am thankful that life has worked out the way it has, and greatly appreciate your friendship, guidance, time, and support in guiding me through this journey.

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To my colleagues and friends in Cohort 12, you have had a huge part in making this challenging endeavor worthwhile. Thank you for being great teammates and supporters, and for keeping me sane through the last three years of this program and in this crazy world we have lived in.

Finally, to my friends who are truly family to me. While I will not call you out by name, I sure hope you understand how much you mean to me. None of you would have a remote interest in reading this paper, yet you are the people I love being around. Thank you for your support through this process, and more importantly, thank you for being my people.
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ABSTRACT

School finance formulas vary from state to state, impacting school district educational outcomes. Rural school districts are especially affected due to inherent challenges in producing high student achievement scores. This study examined whether variables including socioeconomic status and per-pupil local tax level impacted student achievement percentages on the Missouri Assessment Program (MAP) Mathematics assessment given Spring 2019. For this quantitative research, one-way ANOVA and multiple regression analyses were utilized. While ANOVA results indicated that student free and reduced lunch percentages and per pupil allotment from local taxes both have statistically significant effects on student achievement, multiple regression analyses indicated only free and reduced lunch was a significant predictor in the model. Recommendations for further research include examining reasons Missouri free and reduced lunch percentages continue to rise and conducting a similar study with differing grade levels and subject levels to determine whether results remain consistent.

Keywords
school finance, rural education, standardized testing, middle school, mathematics
SECTION ONE
INTRODUCTION TO THE DISSERTATION IN PRACTICE

Background of the Study

Policymakers, researchers, and media continually examine education in the United States under a microscope. State constitutions require free public education for all students (Farrie et al., 2019; Sciarra & Hunter, 2015; Verstegen, 2015), yet allow wide variance in how states and local school districts deliver that education. One of our nation’s greatest challenges is ensuring equitable opportunity for all students (Augenblick et al., 1997; Baker et al., 2020; Bowling et al., 2019; Johnson & Vesely, 2017; Toutkoushian & Michael, 2008; Verstegen, 2015), especially when school districts are of different sizes and have varying needs. Ensuring school districts have the necessary resources to meet those needs is a daunting, and often criticized, task for state legislatures. Annual public school district funding allocations can cause concern for district personnel and communities alike.

School finance is a topic that is frequently discussed, examined, and compared both with other countries and within the United States. Most public school funding is raised at the local level via property taxes (Jackson et al., 2015; Raikes & Darling-Hammond, 2019). During the past 40 years, numerous school districts have filed lawsuits in various states arguing that public schools do not receive the necessary funding at state levels to provide equitable, adequate, and quality education (Baker & Corcoran, 2012; Glenn, 2009; Sweetland, 2012). A local example is the 2005 Montoy v. Kansas lawsuit, which led the Kansas Supreme Court to mandate an increase in state aid to school districts (Baker, 2018; Zeff, 2015). Similar litigation has spurred states to create their
own funding systems, with the majority utilizing a foundation formula model (Baker, 2018; Verstegen & Jordan, 2009), determining the amount of state funding provided and what is then expected or allowed from local resources (Farrie et al., 2019). Although this holds states accountable for funding public school districts, as Strange (2011) noted, there “are truly 50 unique systems” depending on the state and its model (p. 12). This has led to inequities both outside and inside state borders.

**Public School State Funding Levels**

Additionally, while educational costs and accountability continue to rise, state funding levels continue to remain stagnant in overall support percentages. As referenced in Table 1, during the 1996–97 school year, the funding percentage levels of support were 7% federal, 45% state, and 48% local (Augenblick et al., 1997). During the 2014–15 school year, those levels were 9% federal, 46% state, and 45% local, comprising school district funding (Baker et al., 2018; Farrie et al., 2019; Hinojosa, 2018). With the addition of numerous technological advances, increased focus on assessments and data collection, and advances in overall educational outcomes, school districts are pressured to rely on increased funding to support their efforts. However, as Baker et al., (2020) noted, the “share of a state’s economic capacity spent on K-12 schools is now at its lowest point since 1982” (p. 10).
Table 1

Percentage of Funding Levels Supporting U.S. Public School Districts

<table>
<thead>
<tr>
<th></th>
<th>1996–97 School Year</th>
<th>2014–2015 School Year</th>
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<tbody>
<tr>
<td>Federal Funding</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>State Funding</td>
<td>45%</td>
<td>46%</td>
</tr>
<tr>
<td>Local Funding</td>
<td>48%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Stagnant state support is a harsh reality for Missouri public school districts as costs have increased and funding percentage levels have remained constant, causing a decrease in available resources (Baker et al., 2018; Baker et al., 2020). Baker and Corcoran (2012) noted that as of 2012, Missouri provided less than 41% in state funding, lower than the national average, necessitating districts to rely more heavily on local funding (Rinehart, 2016). As of 2015, Missouri ranked 31st in predicted funding level based on per-pupil funding from the state level (Baker et al., 2018). In addition, Missouri lags behind other states when focusing on higher-poverty districts. Missouri is deemed regressive based on funding distribution, providing less than 5% of additional funds to high-poverty districts as compared to low-poverty districts (Baker, 2018) and ranking 45th overall for this funding when compared to other states (Baker et al., 2018; Darling-Hammond, 2019).

Rural Missouri and Poverty

Many of Missouri’s highest-poverty districts are in rural areas (Baker et al., 2020). Rural areas continually suffer from state funding systems that fail to consider the
unique educational needs of rural students, families, and schools (Brenner, 2016; Bryant, Jr., 2010; Strange, 2011). One-size-fits-all approaches at the state and national levels, including education policies, have created additional challenges for rural school districts. According to statistics from the National Center for Education Statistics (NCES), approximately 7.5 million public school students were educated in rural school districts during the 2016–17 school year (Showalter et al., 2019).

In addition, certain large suburban districts have rural student populations. When factoring in rural schools that are part of nonrural districts, that number grows to over nine million students (Showalter et al., 2019; Strange, 2011) and equates to approximately 20% of U.S. students attending rural schools (Bigham et al., 2014; Brenner, 2016; Robson et al., 2019; Showalter et al., 2019). Furthermore, 60% of U.S. counties are mostly or completely rural (Robson et al., 2019), while approximately half of school districts are rural (Brenner, 2016). These numbers justify the importance, as well as the civic and legal obligation of government and education officials, of ensuring that funding sources and opportunities are equitable for all public school students in their state, including those in rural school districts.

**Statement of the Problem**

Minimal information exists on the relationship of rural Missouri public school funding and student academic achievement. American public school finance and its relationship with student achievement has been widely researched and discussed since the 1960s. Studies exist that provide mixed results in terms of attributing higher funding to a positive impact on student achievement (Marion & Flanigan, 2001; Lindahl, 2011; Rauscher, 2018). Research prior to 1966 found that the higher the districts’ resources, the
higher the academic student outcomes (Marion & Flanigan, 2001). From this observation, researchers identified a positive relationship between increased school funding and improved learning outcomes (Lindahl, 2011; Rauscher, 2018).

Further empirical research studies (Coleman, 1966; Dickinson, 2016; Downey & Condron, 2016) on the topic began in 1966 and were first highlighted in the Coleman Report. Coleman’s research team concluded that funding was not influential on student academic success, determining that family background and socioeconomic factors delivered the biggest impact on student learning (Coleman et al., 1966; Dickinson, 2016; Downey & Condron, 2016). Coleman further inferred that school spending, measured by per-pupil spending, was unrelated to student outcomes on achievement tests (Baker, 2017; Coleman et al., 1966; Dickinson, 2016; Downey & Condron, 2016; Jackson et al., 2015; Rauscher, 2018).

Hanushek (1986, 1996) supplemented this research by evaluating 112 different studies on similar topics concerning increased funding and achievement. Hanushek determined from these studies that no “consistent relationship” existed between school spending and student performance (as cited in Baker, 2018, p. 35). This led late-20th-century researchers to conclude no causal relationship between increased expenditures and increased student performance (Baker, 2017; Chaudhary, 2009).

Recently, Marchand and Weber (2020) found a reduction in assessment scores despite a tripling tax base caused by the Texas shale boom. Increased spending in these districts was noted in capital spending and debt services, but not in payroll categories increasing staff salaries, leading to increased teacher turnover (Marchand & Weber, 2020). These researchers surmised that increased funding was not generating higher
student academic achievement in Texas; however, in recent studies, Barnum (2018), Jackson (2020), and Lafoutine et al. (2018) described positive relationships between funding and student achievement.

These studies have shown that higher school funding levels accompany higher assessment scores (Baker et al., 2020; Darling-Hammond, 2019; Farrie et al., 2019; Hinojosa, 2018; Jackson et al., 2015). Current research, whose authors utilize data analysis with “advances in data quality and statistical techniques [...] consistently show[s] that money makes a difference” (Baker, 2017, p. 5). Darling-Hammond (2019) concurred, stating that with increased spending, achievement improves, “especially for students from low-income families” (p. vi). Bartels (2014), Linthacum (2016), and Rinehart (2016) have conducted recent studies to examine various factors connecting Missouri public school districts and finances.

Bartels (2014) determined that the most significant positive variable on district effectiveness, as measured by Missouri School Improvement Program (MSIP) 5 scores, was expenditures on instructional salary per pupil. Linthacum (2016) created a predictive model to determine what variables had the most significant effect on student performance and found that total instructional resources and students’ free and reduced lunch levels had the strongest relationship. As noted by Linthacum, his study was consistent with findings previously discussed by Hanushek based on school funding and student achievement. Rinehart (2016) determined whether specific economic disparity variables affected student success percentages on the English I end-of-course (EOC) assessments for rural Missouri students. Although a strong relationship was found in regression analysis concerning student free and reduced lunch status, analysis of variance (ANOVA)
analyses showed significant and small effects based on assessed valuation and household income and a significant and large effect based on the aforementioned student free and reduced lunch status.

However, no studies have been conducted investigating the possible relationship between funding levels for rural Missouri schools and student achievement, especially considering local funding percentages. The problem this study anticipates to address is the dearth of previous studies specifically focused on rural school funding and student achievement. This lack of knowledge causing challenges for rural superintendents who increasingly depend more on local funding efforts to manage school operations yet are unsure whether increased local funding may improve student assessment outcomes.

**Purpose of the Study**

This study’s purpose is adding to a body of research knowledge and providing a one-year determination of whether rural Missouri school district local funding percentage levels have a significant relationship with student success percentages, based on a standardized Missouri assessment given to all seventh-grade mathematics students. Although school district officials lack control over federal and state funding for their districts, this knowledge may assist in determining whether adjusting local funding levels could influence student success outcomes. Gauging individual student success is important; perhaps more important, however, is the overall evaluation, accreditation, and reputations of Missouri school districts, which are heavily based on these assessment results.

Based on the 2018–19 Rural Education Achievement Program (REAP) Master Eligibility list (U.S. Department of Education, n.d.b), 268 of 518 Missouri public school
districts were deemed rural schools and eligible for REAP funding. Considering 52% of Missouri schools are rural, the importance of understanding whether local funding support levels matter when analyzing assessment scores is a valid undertaking (Baker et al., 2020; Verstegen, 2015). Although increasing local funding is not a simple matter, this study may support strong consideration of whether raising local tax levies would be worthwhile in terms of raising student performance scores.

Beyond the local level, it is vital that state leaders continue to consider funding equity issues (Baker et al., 2020; Verstegen, 2015). Baker et al. (2020) noted that U.S. direct education expenditures as a percentage of gross state product (GSP) were 3.7% in 2004, and since hitting 4.1% in 2009, they have continued to decline (p. 10). In 2017, the national average was 3.53%; in Missouri, however, the state average was 3.42%, ranking 29th (Baker et al., 2020, p. 9). Instead of growing incrementally with increased requirements and expectations, Missouri continues to rely on local school districts to shoulder more financial load regarding student education and achievement (Baker et al., 2020). It is imperative that school district leaders understand whether local funding percentages have a significant impact on student achievement (Baker et al., 2020; Jackson et al., 2016; Verstegen, 2015).

**Research Questions**

The author utilized eight research questions in this study. Table 2 describes the research questions, the hypotheses, and the null hypothesis. Table 3 describes the research questions, variables, and analyses utilized for the study.
Table 2
Research Questions and Null Hypotheses

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<th>Hypothesis</th>
<th>Null Hypothesis</th>
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<td>1. What are the descriptive statistics for rural Missouri school districts during</td>
<td>H1: There will be a significant difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural districts and levels of local funding support?</td>
<td>Ho1: There will be no significant difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural districts with low, medium, and high levels of local funding support?</td>
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<td>the 2018-19 school year considering Grade 7 MAP mathematics assessment results,</td>
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<td>local funding support, local assessed valuation, student free/reduced lunch</td>
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<td>eligibility, district base teacher salary, maximum per pupil allotment through</td>
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<td>local taxes, districts who receive/did not receive DESE Small Schools Grant</td>
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<td>funding, and factors that predict performance on the assessment?</td>
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<td>2. Is there a difference in quartiles in rural Missouri public school student</td>
<td>H2: There will be a significant difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?</td>
<td>Ho2: There will be no significant difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?</td>
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<td>3. Is there a difference in quartiles in rural Missouri public school student</td>
<td>H3: There will be a significant difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?</td>
<td>Ho3: There will be no significant difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?</td>
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<td>public school student success percentages on the 2019 Grade 7 MAP</td>
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<td>Ho4: There will be no significant difference in quartiles between</td>
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<td>2019 Grade 7 MAP mathematics assessment and rural Missouri</td>
<td>2019 Grade 7 MAP mathematics assessment and rural Missouri</td>
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<td>5. Is there a difference in quartiles between rural Missouri public</td>
<td>H5: Is there a difference in quartiles between rural Missouri</td>
<td>Ho5: Is there a difference in quartiles between rural Missouri</td>
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<td>MAP mathematics assessment and district base teacher salary?</td>
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<td>6. Is there a difference in quartiles between rural Missouri public</td>
<td>H6: Is there a difference between rural Missouri public school</td>
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<td>7. Is there a difference between rural Missouri public school student</td>
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<td>districts who receive/did not receive DESE Small Schools Grant funding?</td>
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<td>8. What factors predict performance on the 2019 Grade 7 MAP mathematics</td>
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### Table 3

**Research Questions, Variables, and Analyses**

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Data Type</th>
<th>Statistical Analysis</th>
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</thead>
<tbody>
<tr>
<td>1. What are the descriptive statistics for rural Missouri school districts during the 2018-19 school year considering Grade 7 MAP mathematics assessment results, local funding support, local assessed valuation, student free/reduced lunch eligibility, district base teacher salary, maximum per pupil allotment through local taxes, districts who receive/did not receive DESE Small Schools Grant funding, and factors that predict performance on the assessment?</td>
<td>Categorical &amp; Continuous</td>
<td>Frequencies, disaggregated means, and standard deviations</td>
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<tr>
<td>2. Is there a difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural districts and levels of local funding support?</td>
<td>Local funding percentages</td>
<td>MAP Math score</td>
<td>Continuous</td>
<td>ANOVA</td>
</tr>
<tr>
<td>3. Is there a difference in quartiles in rural Missouri public school student success</td>
<td>Assessed Valuation</td>
<td>MAP Math score</td>
<td>Continuous</td>
<td>ANOVA</td>
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percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?

<table>
<thead>
<tr>
<th>Question</th>
<th>Variable</th>
<th>Type</th>
<th>Test</th>
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<tbody>
<tr>
<td>4. Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages?</td>
<td>Student free/reduced lunch percentages</td>
<td>MAP Math score</td>
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<tr>
<td>5. Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and district base teacher salary?</td>
<td>District base teacher salary</td>
<td>MAP Math score</td>
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<tr>
<td>6. Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per pupil allotment through local taxes?</td>
<td>Per pupil allotment through local taxes</td>
<td>MAP Math score</td>
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<td>7. Is there a difference between rural Missouri public school student who receive/did not receive DESE</td>
<td>Districts who receive/did not receive DESE</td>
<td>MAP Math score</td>
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success percentages on the 2019 Grade 7 MAP mathematics assessment and districts who receive/did not receive DESE Small Schools Grant funding?

8. What factors predict performance on the 2019 Grade 7 MAP mathematics assessment?

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<tr>
<th>Variables utilized in research questions 2-7</th>
<th>Variables utilized in research questions 2-7</th>
<th>Variables utilized in research questions 2-7</th>
<th>Continuous</th>
<th>Multiple Linear Regression</th>
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<tr>
<td>MAP Math score</td>
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**Theoretical Framework**

Inequity is a concept that permeates all facets of life, including the public education system (Baker et al., 2020; Verstegen, 2015). Although we strive to shield students from harsh inequities possibly awaiting them after high school graduation, we subject them to state funding systems that provide an unequal playing field from the moment they first step in the kindergarten classroom (Baker et al., 2020; Jackson et al., 2016; Verstegen, 2015). School finance systems should be designed with the idea that every child would have equal opportunities to learn (Verstegen, 2015) and “achieve desired educational outcomes” (Baker & Corcoran, 2012, p. 16). As Darling-Hammond (2019) described, equity refers to the “extent to which states allocate funding so that low-wealth districts and students with greater needs get more, so that they can reach an adequate level of educational opportunities and outcomes” (p. 4).

States are legally required to allocate sufficient resources ensuring their public school students are provided opportunities to meet specific academic outcomes (Baker & Corcoran, 2012). This funding is based solely on distributing revenues amongst public school districts, often disregarding other factors specific to each district, such as wealth
or property values (Hinojosa, 2018). Challenges abound in meeting the needs of multiple school districts with a wide variety of characteristics, expenses, and local revenue sources (Augenblick et al., 1997). The goal of financial equity in funding school districts continues to prove difficult for states to achieve (Johnson & Vesely, 2017).

As Baker (2018) described, in 1979, Berne and Stiefel created a framework of equity and fairness for state school finance systems, which predated current funding systems and No Child Left Behind (NCLB). Their concept of equity noted that “the idea of equity involves value judgments about how to determine fairness in the financing of K-12 education” (National Research Council, 1999, p. 10). This conceptual framework was based on two main framing questions. The first question was equity of what, which Baker (2018) “suggested . . . could be framed in terms of financial inputs to schools, real resource inputs (such as teachers and their qualification), and outcomes” (p. 21). The focus of this question was money; how much a state could, or should, allocate to ensure educational opportunities and results were fair and available for all students.

The second question of the framework was focused on equity for who, which Baker (2018) noted “typically involved ‘students’ and ‘taxpayers’” (p. 21). In this framework, Berne and Stiefel specified that a “state school finance system should be based on fair treatment of taxpayers and yield fair treatment of students” (as cited in Baker, 2018, p. 21). Although students are often blissfully unaware of whether their treatment is equitable, taxpayers certainly are aware. Perhaps rightfully so, taxpayers are opinionated on who receives their tax dollars, the amount of those tax dollars, and how those dollars should be spent. Disparities in the amount of taxes collected between neighboring districts, and statewide, leads to bitter feelings among district taxpayers
States currently have various methods of funding public school districts, structuring foundation formulas to ensure both horizontal and vertical equity.

**Berne and Stiefel’s Horizontal Equity**

Horizontal equity focuses on the equal treatment of equals (Baker, 2018; Baker & Corcoran, 2012; Berne & Stiefel, 1994; Toutkoushian & Michael, 2008; Verstegen, 2015). In state school finance systems, horizontal equity is present when every district receives the same amount per pupil because it is assumed all students are the same (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001; Toutkoushian & Michael, 2008; Verstegen, 2015). This equal allotment is designed to ensure all students meet the same standardized educational goals (Augenblick et al., 1997; Hinojosa, 2018). Often, these funds are distributed based on a specific number, such as student average daily attendance (Baker, 2018; Hinojosa, 2018).

Horizontal equity is considered a “fair” method of distributing wealth because basing funding on an equal number ensures states provide equal educational opportunity (Johnson & Vesely, 2017). Horizontal equity does not account for differing factors in public school districts, including property wealth, income levels, or location (Baker, 2018; Baker & Corcoran, 2012; Hinojosa, 2018; Mathis, 2001). In addition, horizontal equity does not guarantee equitable opportunities for all students (Baker, 2018) because some students have specific needs that are unequal to their peers. As Johnson and Vesely (2017) explained, “the pursuit of equitable treatment of students often results in the unequal distribution of resources” (p. 92). This acknowledgment of unequal resources for districts highlights the importance of vertical equity.
Berne and Stiefel’s Vertical Equity

The premise of vertical equity is that all students are not created the same. Similar to providing educational services to students, this pertains to state school finance systems as well. Vertical equity is the unequal treatment of unequals (Baker, 2018; Baker & Corcoran, 2012; Berne & Stiefel, 1994; Mathis, 2001) and is focused on the needs of individual students. Baker (2018) discussed vertical equity as “requiring differentiation of programs and services, including additional supports” (p. 22). Students possess varying needs, necessitating states to provide different funding amounts to school districts (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001; Verstegen, 2015). This unequal funding is necessary to provide additional support, increasing opportunities for at-risk students’ success (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001).

Public school districts have varying needs and students who require more academic support and interventions (Baker, 2018; Toutkoushian & Michael, 2008). This requires districts to spend more to ensure all students reach academic goals (Mathis, 2001). To achieve vertical equity, state formulas utilize multipliers, or weighted counts, in their funding formula to create more aid for students with greater academic needs (Baker & Corcoran, 2012; Hinojosa, 2018; Johnson & Vesely, 2017; Mathis, 2001). These formula methodologies vary as regards determining students who qualify for weighted counts but often include free and reduced lunch percentages, special education populations, students for whom English is not a first language, and foster care or homeless students (Hinojosa, 2018; Johnson & Vesely, 2017). As Verstegen (2015) noted, “children in dissimilar circumstances can be treated differently but only for legitimate and justifiable reasons” (p. 3).
Design of the Study

Setting

Rural Missouri public K-8 and K-12 school districts were the setting for this study. These schools are monitored under the regulatory guidance of the Missouri Department of Elementary and Secondary Education (DESE), and financial reporting is required by the DESE School Finance division. In addition, the researcher exclusively selected public schools for this study owing to their mandated participation in the Missouri Assessment Program (MAP), utilizing these assessments to measure student skills and knowledge based on the Missouri Learning Standards (MLS; Missouri DESE, 2021g).

Participants

The researcher included 268 Missouri public school districts in this study based on their rural school district classification, determined from U.S. Department of Education REAP guidelines, which provides funding through the Small, Rural School Achievement Program (SRSA) (U.S. Department of Education, n.d.b). This funding is assists rural school districts in providing opportunities and innovations to improve student achievement (U.S Department of Education, n.d.b). To determine qualifying schools, the researcher consulted the 2019 fiscal year REAP Master Eligibility List (U.S. Department of Education, n.d.b). Districts qualified by meeting two standards:

1) “total average daily attendance is less than 600; or each county in which a school served by the Local Education Agency (LEA) has a total population density of less than 10 people per square mile” (U.S. Department of Education, n.d.a), and,
b) “schools have a locale code of 41, 42, or 43 determined by the Secretary of Education; or the district is located in an area deemed rural by a State governmental agency” (U.S. Department of Education, n.d.a).

The selection of all rural Missouri seventh-grade students who completed the 2019 MAP mathematics assessment created a “subgroup who share similar characteristics,” resulting in homogenous sampling (Mertens, 2020, p. 349). Missouri public school students in grades 3–8 complete MAP assessments to fulfill NCLB requirements, while DESE publicly publishes disaggregated results. The researcher acquired overall state results, and individual district results, from the DESE Missouri Comprehensive Data System (Missouri DESE, 2021f), which is an open access site.

Missouri school districts tested students taking the seventh-grade MAP mathematics assessment over the following content categories during the 2019 assessment: ratios and proportional relationships; number sense and operations; expressions, equations, and inequalities; geometry and measurement data analysis; and statistics and probability (Missouri DESE, 2021d). The department converted correct student responses to a MAP scale score with a possible range of 270–600 (Missouri DESE, 2019a). Scoring at proficient and advanced is the desired student performance level for school districts. For a description of the 2018–19 seventh-grade MAP mathematics score ranges, see Appendix A1.

Data Collection Tools and Procedures

The researcher collected data from secondary sources (Mertens, 2020) to aid this study. Sources included the DESE Missouri Comprehensive Data System District Report Card (Missouri DESE, 2021f) and district report cards tabulated following the 2018–19
school year, which were collected from an open access site. The researcher selected seventh graders who completed the MAP mathematics assessment as the dependent variable (Mertens, 2020). Eighth-grade students were considered for this study; however, Missouri eighth graders may complete Algebra I instead of eighth-grade mathematics based on student abilities and school district discretion, thereby providing different course options at the same grade level. Utilizing seventh-grade scores allowed for homogeneity (Mertens, 2020) and allowed K-8 public school district representation.

The U.S. Department of Education SRSA web page was another data source (U.S. Department of Education, n.d.a). Information was available for rural school district classification because the 2018–19 SRSA eligibility information was used to describe qualifying characteristics for rural schools (U.S. Department of Education, n.d.b). In addition, the researcher utilized the 2018–19 SRSA Master Eligibility List to determine all Missouri school districts classified as rural and receiving SRSA funding (U.S. Department of Education, n.d.b).

In addition, the Missouri Salary Schedule and Benefits Report was utilized to determine base teacher salaries for the 2018-19 school year (Missouri State Teachers Association, 2019). This report is created from school district superintendent and central office staff submissions on salary and benefits pertaining to their local school district (Missouri State Teachers Association, 2019). The report is published annually by the Missouri State Teachers Association, and is available to the public on their website (Missouri State Teachers Association, 2019). Two schools who met rural school qualifications were not listed in the report. The researcher called both Glasgow and
Miller County R-III school districts to obtain their beginning teacher salary for the 2018-19 school year.

**Data Analysis**

The researcher used a quantitative methodological approach to develop the analytical model for the research, based on the independent and dependent variables. He analyzed numerical data to determine relationships between variables (Mertens, 2020). Secondary data available from various sources provided necessary information; therefore, no research instrument was implemented (Mertens, 2020). The researcher created this empirical research study to “build on existing knowledge about a phenomenon” (Mertens, 2020, p. 2). He collected and analyzed study data utilizing both Microsoft Excel® and IBM SPSS Statistics (Version 26) software.

The researcher gathered for each district the following independent variables from the DESE 2019 District Report Card (Missouri DESE, 2021f), including local funding percentages; student free and reduced lunch percentages; assessed valuation of the district divided per 100 students; and student success percentages, based on proficient and advanced percentages, for seventh-grade MAP mathematics scores from spring 2019. In addition, the research utilized the Missouri Salary Schedule and Benefits Report to determine base teacher salaries for the 2018-10 school year (Missouri State Teachers Association, 2019). This data was then separated into quartiles to answer the research questions.

Field (2018) and Mertens (2020) suggested using multiple regression analysis based on the data gathered, allowing several variables to be investigated in the study. The researcher investigated correlational relationships between the independent (predictor)
and dependent (outcome) variables (Mertens, 2020). Furthermore, he utilized multiple regression analysis to determine the variance from each predictor variable (Field, 2018; Mertens, 2020). He selected predictor variables based on their possible impact on student achievement on assessments (Field, 2018; Mertens, 2020).

Mertens (2020) stated that correlation and causation are not interchangeable. Although in this study the researcher does not attempt to prove causation, recognizing the correlation between the predictor and outcome variables may assist school leaders in determining which predictor variables truly influence student achievement based on this one-shot assessment. Identified relationships should enhance decision-making and emphasize whether local funding levels and student success percentages are related.

The researcher utilized ANOVA for this study, using more than two independent variable means to determine which provided statistically significant impacts on student assessment scores (Field, 2018; Mertens, 2020). ANOVA provided inferential statistics that allowed comparisons between different predictor variables (Field, 2018; Mertens, 2020). This ensures that an “observed difference between the groups is too large to occur plausibly as a result of chance alone” (Mertens, 2020, p. 5). As recommended by Field (2018), the researcher utilized a p-value of 0.05 or lower to determine statistical significance.

**Limitations**

Utilizing only the seventh-grade MAP mathematics assessment limits understanding of relationships between other assessments and local funding levels. Assessment data do not provide further knowledge as to whether similar relationships may exist for other grade levels completing other state assessments. Additionally, the
researcher gathered only one school year of assessment data for the study. Utilizing only one grade level, one subject area, and one year’s worth of data, implications for other researchers are difficult to determine.

In addition, the researcher assumed data input from a variety of public school districts in core data reporting through DESE to be correct. Likewise, he tabulated and reported assessment results from DESE and assumed them to be accurate. He also employed figures utilized by the U.S. Department of Education in determining the Missouri rural school districts analyzed in the study and accepted them as accurate.

Furthermore, other study variables are reliant on information provided from sources outside of DESE and the U.S. Department of Education. Parent willingness to report accurate free and reduced lunch information may provide an inaccurate reality of school district poverty data because parents may not accurately report income or simply not return the application when they would qualify. An inflation of free and reduced lunch percentages for school districts also occurs owing to the community eligibility provision provided to districts that have a specified percentage of students who already qualify from applications or direct certification (Missouri DESE, 2021c; The Rural School and Community Trust, 2015). These limitations present challenges for this quantitative study, limiting the assurance of accurate data when determining school district free and reduced lunch percentages.

Assumptions

The assumptions of this study were focused on data available from the U.S. Department of Education and Missouri DESE, under the assumption that data were collected, tabulated, and reported accurately.
Design Controls

Mertens (2020) noted that ethics must “guide the entire process of planning, conducting, and using research” (p. 366). Ethical considerations were at the forefront when determining the design of this study and the data analyzed. The researcher collected public data and used no names identifying school districts or students, preserving anonymity (Mertens, 2020). No instrument was created for use in this study, and statistical analysis software provided data analysis.

Reliability

This study could potentially be replicated in other rural public school settings and provide consistent and reliable results, strengthening reliability (Merriam & Tisdell, 2016). To determine MAP assessment reliability, Missouri DESE states that “the test blueprint along with item specifications, performance-level descriptors and the practice and processes documents provide strong content validity and reliability for the assessment system” (2021, p. 9). These blueprints provide a general guide for educators to understand the assessment structure and MLS to be covered during assessments (Missouri DESE, 2021h). MLS explain what knowledge and skills each grade-level student should have in that subject area and provide a “roadmap” for those expectations (Missouri DESE, 2021h). Both the MAP test blueprints and MLS enhance reliability by ensuring all schools that administer the seventh-grade MAP mathematics assessment provide their students with similar opportunities and understanding of topics assessed.

Validity

The researcher evaluated seventh-grade rural Missouri public school students’ academic performance during this study. This homogeneous grouping of one grade level
eliminated bias (Mertens, 2020) because the researcher included all Missouri schools classified rural by REAP guidelines, and whose assessment data DESE reported, in the study. The larger sample size also provided less result variability (Mertens, 2020).

As described by the Missouri DESE (2021d), MAP assessments are “designed to measure how well students acquire the skills and knowledge described in MLS” (p. 1). This provides construct validity (Mertens, 2020) by measuring how proficient students are in meeting those standards. This information is used to determine strengths and weaknesses for each student and utilized by DESE to determine whether schools are meeting Annual Yearly Progress (AYP) benchmarks (Missouri DESE, 2021d).

**Generalizability**

Results of the study provided limited generalizability owing to its studied population representation (Mertens, 2020). The study included all Missouri school districts classified rural by REAP guidelines and all seventh-grade students completing the 2019 MAP mathematics assessment. Considering the large sample size of the study, transferability is possible (Mertens, 2020), allowing studies to be conducted in other states, focusing on school districts with similar characteristics and on specific state assessments.

**Transferability**

NCLB guidelines require state education authorities to publish disaggregated data from standardized tests (Dodman et al., 2021; Skrla et al., 2004). This allows transferability from this study because researchers can adapt variables, determine relationships, and make judgments in educational studies of their own (Mertens, 2020).
Descriptive data have been provided, allowing researchers enough information to replicate the study (Merriam & Tisdell, 2016).

**Positionality**

This researcher’s occupation as a rural Missouri school superintendent offers positionality for the study (Merriam & Tisdell, 2016). His professional responsibilities require an ethical and unbiased utilization of data in various forms that are collected and verified through a variety of state reports, including the ASBR. In addition, requirements from NCLB and DESE require assessments to be administered and reported. This researcher chose the quantitative method for this study to adopt a pure researcher positionality and reduced potential for biases to skew the research. The researcher designed the study to answer questions that he determined, which were viewed from the researcher’s standpoint (Mertens, 2020). However, utilizing published data prevented personal viewpoints from influencing the final results.

**Definitions of Key Terms**

*Analysis of variance (ANOVA)*: Statistical analysis tool that tests the influence that an independent variable has on a dependent variable (Field, 2018).

*Annual Secretary of the Board Report (ASBR)*: Document annually required and submitted to DESE that provides the annual expenditures, revenues, fund balances, debt, and transportation data for each Missouri public school district (Missouri DESE, 2021b)

*Annual Yearly Progress (AYP)*: Statistics created through No Child Left Behind (NCLB) to measure school district student performance (Darling-Hammond, 2007).

*Assessed valuation (AV)*: The total value of real estate and personal property assessed in each school district. In Missouri, real estate includes residential, commercial,
and agricultural. Personal property includes personal property and locally assessed railroad (Missouri DESE, 2020).

*Average daily attendance (ADA):* Number of students in attendance and counted each day in a Missouri public school district. This number factors into the Missouri Foundation Formula (Missouri DESE, 2020).

*Dollar Value Modifier (DVM):* Dollar value which is designed to adjust for living costs in specific areas Missouri. After determining a median cost of living, those communities and school districts that require higher costs for living and expenses are provided with additional state aid (Monsees, 2012).

*End of Course Assessments (EOC):* Missouri annual assessments used to measure high school student performance in specific grades and subject levels (Missouri DESE, 2021a).

*Every Student Succeeds Act (ESSA):* Signed in 2015 to replace NCLB This law maintained many of NCLB’s premises but yielded more flexibility in decision-making and accountability to the states (Darling-Hammond et al., 2016; Klein, 2016; Wang, 2019).

*Foundation formula:* Funding systems created by states to determine how much money each public school district will receive based on specific factors (Missouri DESE, 2020).

*Free/reduced lunch percentage:* The amount (expressed in a percentage) of students in a school district who qualify for free or reduced cost meals (Missouri DESE, 2020).
**Horizontal equity:** The equal treatment of equals. Horizontal equity is present when every district receives the same amount per pupil (Baker, 2018).

**Leader-Member Exchange Theory (LMX):** Leadership process that is centered on the interactions between leaders and followers (Northouse, 2019).

**Local Education Agency (LEA):** As defined by ESEA, a public board of education who provides direction or administrative control of the public school district (U.S. Department of Education, n.d.a).

**Local funding support:** The amount of finding provided to districts from taxes. This number is expressed as a percentage during this study (Missouri DESE, 2020).

**Missouri Assessment Program (MAP):** The MAP is the grade-level and subject-level tests required by the Missouri DESE. Grades 3–8 are tested in English language arts and mathematics. In addition, Grades 5 and 8 are tested in science (Missouri DESE, 2021d).

**Missouri Department of Elementary and Secondary Education (DESE):** Handles the regulatory duties of Missouri public school districts as a department of the State Board of Education (Missouri DESE, 2021a).

**Missouri School Improvement Program (MSIP):** State of Missouri’s accountability system for public school districts (Missouri DESE, 2019b).

**No Child Left Behind (NCLB):** Federal regulation enacted in 2001 mandating public schools to participate in accountability methods and assessments to quantify student performance (Dodman et al., 2021; Klein, 2015).

**Per-pupil spending:** Average amount a school district spends on each student (Missouri DESE, 2020).
Race to the Top (RTT): As part of the American Recovery and Reinvestment Act of 2009, RTT was a competitive grant encouraging innovation from states in strengthening their education systems (Boser, 2012; Brenner, 2016).

Rural Education Achievement Program (REAP): Provides funding to rural districts for education initiatives, including SRSA (U.S. Department of Education, n.d.a).

School success: For the purposes of this study, school success on the 2019 MAP Mathematics assessment is based on student scores achieved at the proficient and advanced levels (Missouri DESE, 2021a).

Small, Rural Student Achievement Program (SRSA): Provides LEA’s grant money to fund technology or activities designed to improve student achievement (U.S. Department of Education, n.d.a).

Student Adequacy Target (SAT): Amount provided through the Missouri Foundation Formula to school districts based on ADA (Missouri DESE, 2020).

Student Success: For the purposes of this study, student success on the 2019 MAP Mathematics assessment is based on scores achieved at the proficient and advanced levels (Missouri DESE, 2021a).

Tax levy: Amount set by school districts that determines how much taxpayers pay on their assessed tax bill (Missouri DESE, 2020).

Vertical equity: The unequal treatment of unequals. Vertical equity is present when states provide unequal funding to school districts based on student populations with varying needs (Baker, 2018).
**Weighted Average Daily Attendance (WADA):** The average daily attendance combined with an additional increase for specific student characteristics (Missouri DESE, 2020; Shuls, 2017).

**Significance of the Study**

This study benefits both the practice of school leaders and the scholarship of researchers in determining possible relationships between rural school district local funding percentages and a required standardized Missouri assessment. While little research exists concerning the topics of Missouri school funding and its impact on student assessment scores, the impetus for financial decision making is important. Knowledge gained from this study may impact a variety of leaders and scholars, both in Missouri and nationally.

**Practice**

This study benefits the practice of educational leaders and policymakers by illuminating how local funding potentially affects student achievement on a state-required assessment. The significance of money for a school district leader is easily explained; however, detailing whether funding specially affects student achievement is not easily quantifiable. Earlier research touted by Hanushek described “uncertainty about whether a consistent relationship exists between spending and student outcomes (as cited by Baker, 2018, p. 35), more recent studies describe positive relationships (Barnum, 2018; Jackson, 2020; Lafortune et al., 2018). In addition, Darling-Hammond (2019) found that increased funding promoted achievement increases in all students, but especially for students from low-income families. Determining whether local funding percentages in a school district
are a significant factor in achievement scores may benefit school leaders who strive to streamline budgets to maximize student success.

Rural school districts and their students’ success is also under the microscope during this study. Over half of Missouri school districts will be examined, emphasizing the significant presence of rural school districts in that state. Rural school district needs vary but must be considered in legislative decision-making. Research evaluating the importance of local funding sources should prove beneficial and provide better understanding for district leaders and policymakers.

Rural school districts have no input on state formula monies and cannot control the wealth of their tax base. However, one legal route is possible to raise local revenues. Careful consideration should be given by rural school districts to their local tax levy, which is their one option to influence the overall local revenue amount the district receives. Possessing knowledge of whether local funding affects student achievement could assist in determining whether it is wise, and worthwhile, to approach their community for assistance in raising additional funding.

This study would also enhance local Board of Education decision-making. Tough decisions are necessary concerning finances annually, considering both revenues and expenditures. Salary and facility expenses are large factors in budgets, requiring considerations on staffing, equipment, technology, and other educational opportunities provided to students. In a rural locale, limited revenues and increasing expenses may dramatically affect student academic success.
Scholarship

While studies have been conducted searching for the relationship between money and student success, none have been conducted determining the effects of local funding on rural Missouri school districts and students. Earlier research by Bartels (2014), Linthacum (2016), and Rinehart (2016) studies various variables and their relationship with Missouri funding but did not assess local funding levels. Various national studies have used per-pupil spending as their funding variable (Baker, 2018; Darling-Hammond, 2019), yet the impact of local funding would have been difficult to assess. Research in this area could be crucial to district leaders, legislators, and DESE as they consistently evaluate school district funding. Due to the enormous amount of importance issued to the student success outcomes on standardized assessments in many states, an understanding of how specific factors can influence these outcomes is a worthwhile scholarly endeavor.

Furthermore, the study results will also be a valuable addition to the existing research base. Although states possess various funding structures, local funding affects every American school district. Understanding whether local funding percentages influence student success percentages provides valuable insight into whether raising tax levies provides a beneficial increase in student achievement.

Summary

In this study the researcher will determine the level of impact on rural Missouri student success percentages from one MAP assessment based on local funding percentages. Although based on only one assessment and grade level, the implications could strongly influence funding considerations at both local and state levels. Whereas previous research studies conducted by Bartels (2014), Linthacum (2016), and Rinehart
(2016) included studying Missouri school district success with a variety of variables, this study’s author will determine whether the local funding percentages affect student achievement on a required standardized assessment.

If it is determined that local funding percentages truly influence student achievement, it is imperative this research is shared with a wide variety of local and statewide stakeholders. This research was conducted in rural school districts, which account for over half of Missouri school districts represented. Although these school districts may possess smaller enrollment numbers than their suburban and urban counterparts, the demographic should not be ignored. Stakeholders have a duty to ensure strong opportunities for student achievement are available for all Missouri students. If this study provides discussion and considerations recognizing the importance of funding sources, it may positively influence rural Missouri school districts and perhaps rural districts nationwide.
SECTION TWO

PRACTITIONER SETTING FOR THE STUDY

School funding and its impact on decision-making is a challenge faced daily by school superintendents (Augenblick et al., 1997; Baker, 2017; Dhaliwal & Bruno, 2021). However, funding is just one aspect of a superintendent’s role in leading a school district (Bouck, 2004; Bryant, 2010; Farmer et al., 2006; Fishman, 2015). Although often these decisions must be made without the input of others, there are organizations in Missouri available to assist, support, and provide professional development to superintendents (MASA, 2021d). Whether this is accomplished through first-year superintendent mentoring programs or conferences that provide a wide variety of nationally renowned speakers, workshops, and educational presentations that enhance the knowledge and abilities of Missouri school superintendents and central office personnel, the Missouri Association of School Administrators (MASA) is an organization designed to meet the needs of all Missouri superintendents (MASA, 2021d).

MASA provides professional development for, offers support to, and enhances the abilities and knowledge of school superintendents and central office personnel in Missouri. With a membership of over 600 (MASA, 2021d), MASA is the foremost organization for representing Missouri school superintendents both locally and nationally. As its mission statement explains, MASA exists to “develop and support effective public school leaders who positively impact the lives of Missouri students” (2021d, p.1).

To guide its mission, MASA created a Strategic Plan in 2015 with priorities and objectives to improve and enhance Missouri school superintendents’ knowledge and abilities through MASA professional development, mentoring, and support. The three
key strategic priorities included: 1) maintain strong membership and financial stability; 2) increase leadership capacity through professional development and collaboration; and 3) identify allies and build partnerships that effectively protect, promote, and advance public education (MASA, 2015). In addition to these priorities, the plan described a realignment of duties and a creation of staff positions to support its long-range goals. The MASA website states a new strategic plan was to be created in 2020, but at time of writing the strategic plan has not been updated.

History of the Organization

G.V. Buchanan of Sedalia was the first president on record for MASA, dating back to 1900 (K. Hinshaw, personal communication, September 14, 2021). MASA was a department of the Missouri State Teachers Association (MSTA) until 1975 and an affiliate of MSTA until 1988 (K. Hinshaw, personal communication, September 14, 2021). Additionally, in 1975, MASA filed Articles of Incorporation with the Missouri State Auditor to be recognized as its own Missouri entity (K. Hinshaw, personal communication, September 14, 2021).

In 1988, the Missouri Council of School Administrators (MCSA) was created as a nonprofit organization consisting of both MASA and the Missouri Association of Elementary School Principals group (K. Hinshaw, personal communication, September 14, 2021). Gary Sharpe was hired as their first executive director, leading all three groups until 2000, and then continuing as the executive director of both MCSA and MASA until 2007 (K. Hinshaw, personal communication, September 14, 2021). Doug Hayter is the current executive director of MCSA and MASA (MASA, 2021b). It is under the umbrella of the MCSA that MASA continues to provide services today.
Organizational Analysis

When conducting an organizational analysis of MASA utilizing the model of Bolman and Deal (2017), the structural frame and political frame stood out as lenses that may help readers understand MASA in more detail. While trying to meet the needs of superintendents and central office personnel employed by various-sized districts, as well as keeping abreast of constantly changing educational and legislative reforms and policies, the MASA staff have the herculean task of providing support and training to meet a wide assortment of issues and needs.

Structural Frame

As stated by Bolman and Deal (2017), the structural frame provides specific roles and tasks that will maximize performance and relationships. In an organization that works with a large group of individuals with both similar and different needs, it is imperative that MASA has the support system necessary to meet varying interests and concerns. In addition, for MASA to be successful, reciprocal coupling must be initiated between staff and its membership, sending information back and forth to strengthen overall decision-making and opportunities (Levi, 2017; Mintzberg, 1979). Creating an organizational structure that considers the strengths of its staff, its overall goals and objectives, and accessible resources to improve its services creates a valuable organization for membership (Bolman & Deal, 2017).

Creating an organizational structure begins with staffing, which was discussed in its 2015 Strategic Plan. During that time, three positions were added to the existing staff to meet its organization and membership needs. Although the positions of Executive Director and Director of Leader Development were already in place, the new positions of
Director of Legislative Advocacy and Director of Communications were created. Additionally, the Director of the Missouri Superintendents Academy was also established. This group of directors forms the strategic apex of MASA, working both independently and interconnectedly to ensure the organization lives its mission (Mintzberg, 1979). Figure 1 shows the MASA Organizational Chart.

**Figure 1**

*Missouri Association of School Administrators Organizational Chart*

MASA is funded through membership dues, and members have an important voice in the decision-making process and initiatives of the organization. Through its Executive Committee, membership has a powerful group that assists in developing short- and long-term plans, establishing legislative priorities, and determining programming and support for membership. This organizational design allows for the creation of a high-performing team, empowering the sharing of expertise, improving communication, and
creating a strong working relationship with and among members (Bolman & Deal, 2017; Levi, 2017).

MASA membership elects an Executive Committee, which consists of MASA members located throughout the state, including a president, president elect, secretary, treasurer, past president, Ex-Officio School Superintendents Association (AASA) Governing Board, and the MASA Executive Director (MASA, 2021c). In addition to the Executive Committee, each region of the state has its own local group that possesses the offices of president, vice-president, and secretary/treasurer. Those regions include Greater Kansas City District, Greater St. Louis District, Northeast District, Northwest District, South Central District, Southeast District, Southwest District, and the West Central District. Figure 2 describes the MASA Executive Committee.

Figure 2

*Missouri Association of School Administrators Executive Committee*

Although MASA has a structure in place to provide support and services for its members, challenges may still result owing to its diverse membership. With over 600
members from a wide variety of locales and sizes, finding common ground to support members is a daunting task. This becomes the most apparent when looking at MASA through the lens of what Bolman and Deal (2017) termed the political frame.

**Political Frame**

Finding common ground regarding educational reforms and legislative priorities would be challenging for MASA. With members possessing different values, beliefs, and interests for their local school districts, MASA strives to find common ground in decision-making (Bolman & Deal, 2017). Along with other special interest groups throughout the state and at the capital in Jefferson City, MASA competes for scarce resources for its membership, which can cause conflicts both at state and local levels (Bolman & Deal, 2017). However, as an alliance of many influential leaders throughout the state, MASA’s collective voice exerts a powerful influence in legislative offices and communities alike (Bolman & Deal, 2017).

MASA possesses referent power because its members trust that the organization is going to represent them and provide the resources necessary to help them become better administrators (Bolman & Deal, 2017; French, Jr. & Raven, 1959). In addition, some expert power is possessed by MASA, given it is an accepted source of expertise and guidance provided through its superintendent mentoring programs (Bolman & Deal, 2017; French, Jr. & Raven, 1959). These sources of power are often built as MASA’s directors map the political terrain and build coalitions (Bolman & Deal, 2017), thereby ensuring MASA represents the needs of their membership, and continue to build trust and belief in their organization.
Politics is a daily part of life for every individual, and that is no different for organizations, including school districts and MASA. Decisions made at the capitol building have huge ramifications for the education of Missouri students, especially in the areas of funding. MASA creates a legislative platform annually with the help of its membership and Executive Committee, and as noted earlier, as a Director of Legislative Advocacy to represent those needs. During the 2020–21 school year, one of their three legislative platform topics was to ensure a prioritizing of public education funding (MASA, 2021a). Although this paper is focused on local funding sources, state monies through the foundation formula and other mechanisms certainly affect decision-making toward local funding sources. MASA’s powerful voice as a large membership of school leaders certainly enhances its impact and influence as a political agent on legislative decision-making affecting school finance and reforms (Bolman & Deal, 2017).

**Leadership Analysis**

According to MASA’s mission statement, its focus is developing leaders who will positively affect student lives (MASA, 2021d). Though it can be challenging to teach leadership skills, the methods by which MASA connects with its membership, and connects its membership together, provide leadership examples effectively. These methods can be ascribed to characteristics embedded in leadership theories explained by Northouse.

**Leader–Member Exchange Theory**

As Northouse (2019) explained through leader–member exchange (LMX) theory, “leadership is a process that is centered on the interactions between leaders and followers” (p. 139). This exchange of information is a dyadic relationship and a
benchmark of adult learning (Konradt, 2014; Northouse, 2019). LMX theory is focused on interactional leaders creating relationships with followers that achieve goals for the leader, follower, and organization(s) alike (Konradt, 2014; Northouse, 2019).

Exchanges between the leader and follower that are focused on creating better leaders are also a hallmark of LMX theory (Northouse, 2019). Through opportunities such as networking, conferences, and mentoring, MASA provides occasions for MASA leaders and school district leaders to openly communicate, build relationships, and share information and ideas. Although these relationships are spread across organization boundaries, MASA leadership focuses on providing the services necessary to make its membership successful and perhaps effect transformative changes for leaders and their districts (Christie et al., 2015; Gill, 2010; Merriam & Bierema, 2014).

Within the MASA organization, LMX theory is evident as well. Though the directors all have specific roles, the organization’s success would not be possible without a dyadic relationship focused on communication and relationships internally and with others outside the organization (Northouse, 2019). By demonstrating this leadership approach, it serves to guide beginning superintendents to understand the power of leader–member relationships. LMX theory emphasizes that “effective leadership is contingent on effective leader–member exchanges” (Northouse, 2019, p. 148).

**Team Leadership**

MASA’s leadership wears a wide variety of hats. Coordination of activities, communication with membership, and a constantly evolving education climate necessitate teamwork and cooperation. Without a strong team leadership focus, MASA
would struggle to provide the support and resources necessary to enhance its membership’s leadership abilities.

As Northouse (2019) stated, “a team is a type of organizational group that is composed of members who are interdependent, who share common goals, and who must work collectively to achieve their goals” (p. 372). MASA’s leadership emulates an organizational team. Although MASA’s directors work independently in their specific roles, it is imperative they also work interdependently as well, both for their members and in modeling team leadership for those members. Demonstrating the power of this leadership model through communication and collaboration strengthens the organization and its membership (Bruffee, 1999; Konradt, 2014; Northouse, 2019).

A team leadership model also supports team learning, a hallmark of adult education (Gill, 2010). Networking, dialogue, and reflective learning opportunities strengthen the overall communication and knowledge base of MASA leaders and their membership (Bruffee, 1999; Gill, 2010; Northouse, 2019). As Gill (2010) noted, “well-functioning team[s] have members who learn together and learn how to learn together” (p. 76). This is apparent within MASA and is modeled to Missouri educational leaders.

MASA’s organizational structure and leadership models provide necessary support and guidance for superintendents and central office staff. Without MASA, opportunities for impactful learning, networking, and collaboration may not be possible. Although national organizations may offer guidance, MASA truly supports and inspires leaders in Missouri school districts.
Implications of Research in the Practitioner Setting

This study could benefit MASA and its membership in understanding how local funding percentages influence student success on a standardized assessment, providing valuable data to support budgeting decisions. In addition, further research may be encouraged to determine the effects of other finance variables and their impact on student standardized assessments. Furthermore, MASA can utilize these data in supporting lobbying with the Missouri legislature to help examine the impact of funding on student success. Finally, rural education concerns, including funding and test scores, deserve more research and emphasis from researchers and educational leaders alike.

School Funding Impacts

Excluding Hawaii, 49 states including the District of Columbia allow local taxing to fund school districts (Baker, 2018; Born, 2020). Combined with state and federal revenues, the investment in our education system is substantial. As Born (2020) noted, the total amount of U.S. public education revenues during the 2017 fiscal year was just over $694 billion. However, although this amount of money continues to increase, the amount of funding provided by states has diminished. As Baker (2018) shared, 35 states provided less overall state funding per student in the 2014 school year than was provided in 2008.

The impact of local, state, and national funding decisions on school leaders and their decision-making cannot be understated. A better understanding of the streams of Missouri school funding is prudent for school administrators and central office staff. School finance workshops provided by MASA can utilize these data to connect the impacts of school finance coupled with other variables.
**Legislative Impacts on Missouri Education Funding**

In addition, understanding the impact that legislative decision-making and litigation have on funding may also prove prudent. School reforms, both nationally and within states, during the past 30 years have significantly increased the importance of school district leaders understanding and utilizing various funding sources (Baker, 2018; Born, 2020). Initial research considered by Hanushek (1986, 1996) determined the uncertainty and importance of funding and student success. However, more in-depth analyses by researchers in the past 20 years have shown a positive relationship between spending and increased student success (Baker, 2018; Rauscher, 2020).

MASA employs a director and assistant director of advocacy, who work closely with both its membership and Missouri legislative entities to provide information on the impact legislation will have on public school districts (MASA, 2021). With future research to study the specific effects of legislation and reforms on school funding, and employing data gathered previously by Linthacum (2016), Rinehart (2016), and this study, MASA can utilize specific Missouri data to share with legislators in Jefferson City.

**Rural Missouri Education and Funding**

Additionally, although MASA strives to support all sizes and locales of Missouri school districts, a more specific focus on rural education finance may be gleaned from this study. Rural schools face inherent challenges, and further research must be conducted specifically for rural Missouri school districts and students. Enhanced knowledge can only be beneficial for MASA and school district leaders to understand what effects specific variables have on student success percentages.
Summary

MASA is an organization committed to providing educational opportunities, networking, and support to enhance leadership in Missouri school districts. Through its organizational structure, although directors have specific duties, they work interdependently to combine their vast knowledge to benefit membership. Through this model, they demonstrate the importance of teamwork, collaboration, and communication in creating strong organizations that will benefit both local school districts and their students.
SECTION THREE

SCHOLARLY REVIEW FOR THE STUDY

Although expressed through various sentiments, state constitutions require free public education for all K-12 students (Baker, 2018; Farrie et al., 2019; Sciarra & Hunter, 2015). However, these expectations are broad, especially considering school funding requirements (Farrie et al., 2019). Over the past 50 years, state governments have been tasked with creating school funding models through numerous methodologies and variations (Baker, 2018; Farrie et al., 2019).

School funding is the largest amount of money annually allocated in many states (Baker, 2018). Prior to the 1970s, school funding was primarily raised at the local level via property taxes (Jackson et al., 2016; Verstegen, 2011). Concerns of funding inequities between districts with higher and lower tax bases led to common disagreements over student education equity (Bowling et al., 2019). Although school funding reforms have been focused on shrinking the gap between property-rich and property-poor districts, local funding and property taxes remain a significant component of school district revenues (Baker, 2018; Bowling et al., 2019; Raikes & Darling-Hammond, 2019; Verstegen, 2011). Property taxes continue to produce wealth imbalances between school districts in states (Baker, 2017; Bowling et al., 2019).

In addition to these inequities, national events like the 2007–2009 recession have reduced state allocations to school districts (Baker et al., 2020). As Leachman et al. (2017) noted, 29 states proffered less school funding for students in 2015 than was provided in 2008. In addition, Baker and DiCarlo (2020) noted that state school revenues as part of state economic capacity are at their lowest point since 1982. This
conglomeration of shortfalls requires school districts to increasingly utilize local funding to ensure a quality education for all students, in addition to fulfilling a myriad of accountability requirements (Baker, 2018; Darling-Hammond, 2019).

School Finance Reform Litigation in the United States

Currently 46 states employ a foundation formula model for school funding (Verstegen, 2014). These formulas determine the amount of state aid provided to districts, often considering school district local revenues as an integral part of the funding equation (Baker, 2018; Rebell, 2018). Recent school finance reforms have been focused on funding methods that increase revenues for districts serving larger disadvantaged student populations (Chingos & Blagg, 2017). Over the past 50 years, these foundation formula models have been crafted and modified through three distinct sets of education finance reform litigation cycles.

Early 1970s Litigation

Litigation concerning public school funding has been prevalent since 1970 (Koski, 2017; Monsees, 2012; Obhof, 2004). During the early 1970s, two landmark federal court cases were instrumental in determining the authority for school district funding. These cases were tried under the equal protection clause of the United States Constitution and focused on efforts to lessen the imbalances of unequal local property taxes and per-pupil expenditures in districts (Dayton, 2003; Koski, 2017; Monsees, 2012; Podgursky et al., 2008; Reschovsky & Imazeki, 2001).

The *Serrano v Priest* decision of 1971 argued that district wealth should warrant consideration in state per-pupil funding (Augenblick et al., 1997; Koski, 2017; Monsees, 2012; Reschovsky & Imazeki, 2001). Embedded in this argument was the belief that the
United States Constitution considers education a fundamental right (Augenblick et al., 1997; Banicki & Murphy, 2014). The California Supreme Court determined the state’s school finance system was not “fiscally neutral” (Augenblick et al., 1997, p. 67) and over the next few years gave credence to plaintiffs attempting to prove school funding unconstitutional on federal grounds.

Two years later, the United States Supreme Court heard a case that ended school funding litigation at the federal level. Disproportionate local property tax wealth between school districts was argued during the 1973 San Antonio Independent School District v Rodriguez case (Banicki & Murphy, 2014; Dayton, 2003; Konski, 2017). Again, the court evaluated whether this violated the Equal Protection Clause, specifically focusing on “poor students in poor school districts” (Konski, 2017, p. 1902). Although the Supreme Court agreed the Texas school finance system created inequities, the plaintiffs’ claims were denied because the court determined education was not a responsibility or fundamental interest under the federal constitution (Dayton, 2003; Koski, 2017; Monsees, 2012; Podgursky et al., 2008; Rebell, 2018).

Following this decision, legislation concerning school finance reforms was tried at the state level, focusing on two specific arguments: the equity, and adequacy, of school funding (Calcaterra et al., 2006; Jackson et al., 2016; Koski, 2017; Monsees, 2012). Cases heard during the mid-1970s through the 1980s were based on school finance equity, whereas cases heard since 1990 have been focused more on school finance adequacy (Calcaterra et al., 2006; Dayton, 2003; Jackson et al., 2016; Koski, 2017; Monsees, 2012). This shift in focus was a result of a lack of plaintiff success in proving school finance equity. As Obhof (2004) noted, only 35% of cases arguing school finance
equity reforms were successful; however, since the early 1990s, 65% of legal actions concerning school finance adequacy have been successful (Rebell, 2018). These decisions have spurred school finance reforms in 27 states (Chingos & Blagg, 2017; Jackson et al., 2016; Lafortune et al., 2018). Perhaps not surprisingly, 45 states have experienced litigation concerning school finance systems since 1970 (Podgursky et al., 2008).

**Equity Litigation (1972–1989)**

Although equity reform litigation lacked the success rate of later rulings, these cases were influential in creating or reconfiguring state school finance formula models (Lafortune et al., 2018; Monsees, 2012). During this period, cases were once again focused on equal protection clauses, albeit as state constitutional requirements (Koski, 2017; Podgursky et al., 2008). Plaintiffs continued to focus on local funding discrepancies inhibiting provision of equal education for all students (Jackson et al., 2016). Although legislation attempts often failed, many states updated their funding mechanisms to prevent possible litigation (Lafortune et al., 2018). These new formulas focused on providing horizontal equity amongst all school districts (Koski, 2017; Lafortune et al., 2018; Monsees, 2012; Rebell, 2018).

In 1972, the New Jersey case of *Robinson v Cahill* ushered in equity finance reform cases, considering whether the state was negligent in providing an equitable education to all students (Banicki & Murphy, 2014; Koski, 2018; Minorini & Sugarman, 1999). Similar wording in many state constitutions required courts to interpret vague language concerning fair and equal funding for all school districts (Banicki & Murphy, 2014).
The Robinson v Cahill case was focused on determining a dollar amount that ensured fiscal neutrality (Minorini & Sugarman, 1999). The 1979 Pauley v. Kelly case in West Virginia was focused on school finance equity concerning poorer rural counties that lacked the property wealth to fund education as equitably as other counties (Dayton, 2003; Weishart, 2018). The courts determined that state funding inadequacies failed to eliminate disparities specific to county revenues (Bordas & Bordas, 2019; Dayton, 2003; Weishart, 2018). This decision was instrumental in providing financial equity focus on high-poverty areas, especially rural school districts. The ruling required the state to provide additional resources to high-poverty areas to provide equitable education opportunities (Bordas & Bordas, 2019; Dayton, 2003; Weishart, 2018).

**Adequacy Litigation (1990–Today)**

As equity-based school finance reform cases achieved limited success, a new cycle of litigation occurred, focusing on providing adequate student educational opportunities (Glenn, 2009; Koski, 2018; Lafortune et al., 2018; Monsees, 2012; Rebell, 2018). These cases moved away from horizontal equitable funding distributions and were instead focused on vertical equity (Glenn, 2009; Rebell, 2018; Shores et al., 2019). Litigation concerning adequacy school finance reform fixated on increasing funding for school districts with higher student educational needs (Jackson et al., 2016; Lafortune et al., 2018; Monsees, 2012). Although determinations varied among states, this litigation was often focused on supplying additional funding to high-poverty school districts (Koski, 2018; Lafortune et al., 2018). Often, accountability data were utilized as evidence that states lacked provision of adequate funding to school districts because high-poverty
or high-minority population districts scored worse (Koski, 2018; Monsees, 2012; Rebell, 2018), strengthening the argument for additional financial resources in those districts.

*Rose v. Council for Better Education* was a landmark litigation that ushered in school finance reform considering adequacy. *Rose* was a Kentucky Supreme Court case that argued equal funding was not adequate funding (Dayton, 2003; Lafortune et al., 2018; Podgursky et al., 2008. The Kentucky Supreme Court ruled the state’s education system was unconstitutional and stressed that “all Kentucky students had a constitutional right to an adequate educational opportunity” (Podgursky et al., 2008, p. 176). This decision led to the Kentucky Education Reform Act of 1990 (Koski, 2018; Lafortune et al., 2018), increasing school funding for lower-income districts (Lafortune et al., 2018). After this successful result, plaintiffs in other states focused on state constitution requirements for educational adequacy for all students (Lafortune et al., 2018), using a combination of financial figures and student accountability outcomes to supplement claims.

In the early 1990s, a Massachusetts case was also focused on funding adequacy, and as Baker (2018) noted, even “the most vocal critics of school finance reform concede that Massachusetts may have struck the right balance between funding and accountability reform” (p. 87). The 1993 *McDuffy v. Secretary of Education* lawsuit initiated the creation of a foundation formula that adjusted allocations based on higher educational needs for poverty students, English language learners (ELLs), and students who required special education services (Baker, 2018; Darling-Hammond, 2019). The Massachusetts school finance formula became a template for other states as they began to focus on equity, adequacy, and accountability through school funding (Darling-Hammond, 2019).
Missouri School Finance Litigation, 1993-2019

The Missouri school funding system has also been scrutinized in courtrooms for the past 30 years. In 1993, the Missouri Supreme Court heard the Committee for Educational Equality v. Missouri. The original foundation formula evaluated during this case was implemented in 1955 (Shaw & Hatley, 2000), and although revisions in 1969 and 1977 were designed to improve equity, the formula was grossly underfunded to meet equitable needs (Ko, 2006). As Ko (2006) noted, Missouri was “the worst state in school finance equity in the early 1990s, measured by selected equity indices” (p. 559). The plaintiffs in this case argued that the Missouri school finance system at that time was not equitable, and the court agreed (Jackson et al., 2016; Ko, 2006; Podgursky et al., 2008; Shaw & Hatley, 2000).

Based on this ruling, the Missouri legislature passed Senate Bill 380 and the Outstanding Schools Act, which included 18 different factors in determining district funding (Shaw & Hatley, 2000) and was created to make student spending more equitable throughout the state (Ko, 2006; Podgursky et al., 2008). This new formula strived to equalize financial resources between property-rich and property-poor districts (Monsees, 2012; Podgursky et al., 2008). In addition, a “hold harmless” provision was created, ensuring school districts would not receive less than they received during the 1992–93 school year (Ko, 2006). Though this formula upgraded equitable allocations from previous models, it was quickly evident that the money necessary to fully fund the formula was lacking (Monsees, 2012; Podgursky, 2008). As the state continued to lag behind in funding school districts, the gap between the haves and have-nots widened. As
Podgursky and Springer (2006) noted, by 2004, there was a nearly 3:1 ratio difference between high per-pupil expenditure and low per-pupil expenditure districts.

Commissioned by the Missouri School Boards Association (MSBA), a 2003 study by Augenblick and Myers was instigated to determine an adequate level of funding necessary for Missouri school districts (Monsees, 2012; Podgursky & Springer, 2006; Podgursky et al., 2008). This study was viewed from two vantage points, including “professional judgement” proffered by a panel of educators and a “successful schools” approach, analyzing the spending of schools that met DESE performance targets (Podgursky et al., 2008, p. 179). Augenblick and Myers combined the recommendations of both approaches and concluded that “in 2001–02 Missouri was underfunding school districts by $913 million, not including cost of transportation, food services, or capital expenditures” (Podgursky et al., 2008, p. 179).

Based on this report, over 250 school districts sued the state of Missouri over inadequate funding (Monsees, 2012). Realizing the likely ruling, the legislature enacted Senate Bill 287 before the case was heard, adopting a new school funding formula (Monsees, 2012; Podgursky et al., 2008; Rowe, 2010; Shuls, 2017). This new formula established a State Adequacy Target (SAT) considering the level of adequate spending necessary per student, which was designed to be recalculated and raised every 2 years (Monsees, 2012; Podgursky et al., 2008). The SAT dollar figure was based on expenditures from districts that were high-performance districts as noted by DESE (Monsees, 2012). In addition, efforts were implemented with specific calculations designed to diminish the gap between property-rich and property-poor districts (Shuls, 2017).
Efforts since 2006 to challenge the Missouri school funding formula have fallen short. Lawsuits filed in 2007 (Podgursky et al., 2008) and 2009 (Rowe, 2010) argued that the funding formula violated sections of the Missouri Constitution (Rowe, 2010). Although the dollar amounts have changed, the main structure of the SB 287 formula remains in place today.

**School Finance in the United States**

Modern school finance formulas are designed to achieve two objectives: 1) determine the amount of state revenue provided to local school districts; and 2) determine the extent to which districts can raise local tax money (Baker, 2017; Sciarra & Hunter, 2015). These formulas incorporate state aid amounts provided to districts; however, this number varies from state to state (Baker, 2018; Toutkoushian & Michael, 2008; Verstegen, 2014). State formulas also provide different factors and complexities, creating what Baker and Corcoran (2012) termed policy levers. Initially these formulas were focused on paying the same amount per student, providing horizontal equity (Johnson & Vesely, 2017; Toutkoushian & Michael, 2008; Verstegen, 2015). This amount-per-pupil figure varies among states (Baker, 2018; Verstegen, 2014).

As previously discussed, state finance formulas have been modified to attempt vertical equity, focusing on providing additional financial resources based on student educational needs (Baker, 2018; Johnson & Vesely, 2015; Mathis, 2001; Toutkoushian & Michael, 2008; Verstegen, 2015). This is often accomplished through weighted student counts or through categorical aid amounts based on a specific student population percentage (Hinojosa, 2018). Once again state methodologies and figures vary; however,
the focus remains on ensuring states provide an equitable education to all students (Banicki & Murphy, 2014; Koski, 2018; Verstegen, 2014).

Funding Sources

Most school district funding flows from three specific revenue streams: federal, state, and local (Baker, 2018; Baker et al., 2020; Farrie et al., 2019). Funding percentages over the past 30 years have remained relatively consistent, with state and local revenues on average accounting for approximately 90% of school district revenues (Baker et al., 2020; Barnett & Kasmin, 2016; Farrie et al., 2019; Hinojosa, 2018). Although these percentages have persisted, overall state efforts over direct education expenditures as a percentage of GSP have dropped (Baker et al., 2020). From a high of 4.1% in 2009, state fiscal effort of GSP dropped to a steady 3.5% from 2013–2017 (Baker et al., 2020). This reduction in effort has decreased state aid to districts, imposing a higher demand on local funding to continue financing educational needs (Baker et al., 2020).

Approximately 80% of local school district revenue is collected from property taxes (Barnett & Kasmin, 2016). A school district’s ability to raise revenues is heavily dependent on local property tax wealth (Baker & Corcoran, 2012; Barnett & Kasmin, 2016; Hinojosa, 2018). This is where inequities and inadequacies of school funding continue to plague states and school districts across the nation. Those districts with higher tax bases generate more revenue than those in higher-poverty districts can acquire (Morgan & Amerikaner, 2018; Raikes & Darling-Hammond, 2019). As noted by Morgan and Amerikaner (2018), “the highest poverty school districts receive about $1,000, or 7%, less per pupil in state and local funding than the lowest poverty districts” (p. 6). Although states’ funding formulas currently provide more vertical equity than before,
local revenues continue to perpetuate funding gaps that high-poverty school districts struggle to overcome (Baker, 2018; Morgan & Amerikaner, 2018; Raikes & Darling-Hammond, 2019; Verstegen, 2014).

**State Funding Systems**

Without a federal mandate for funding school districts, states are responsible for implementing a funding mechanism that provides an equitable and adequate education for students. All 50 states have differing methodologies, systems, and figures meeting those requirements (Strange, 2011; Toutkoushian & Michael, 2008). Most states distribute funds based on a structured funding formula (Bowling et al., 2019; Darling-Hammond, 2019; Ferrari et al., 2019; Johnson & Vesely, 2017; Verstegen & Jordan, 2009). Of the 50 states, 37 use a foundation formula, nine employ a combination/tiered system through their formula, two base their funding on various tax rates, North Carolina offers a flat grant, and Hawaii is the only state that fully collects and distributes funding (Verstegen, 2014). These formulas incorporate various methods of accounting for student characteristics that require additional funding support, in addition to providing specific funding amounts per pupil (Baker, 2018; Verstegen, 2014). As a comparison to the Missouri foundation formula, this researcher chose Iowa and Texas to demonstrate similarities, differences, and intricacies possessed by other state school finance systems.

**Iowa**

The Iowa foundation formula possesses three primary funding sources: uniform levy of property taxes, state foundation aid, and additional levy through property taxes (Iowa Department of Education, 2017). This formula is based on an initial school finance model created by the Iowa legislature during the 1970s (Iowa Department of Education,
During the 2017–18 school year, the state contributed $6,664 per student to school districts based on a state cost per pupil (Iowa Department of Education, 2017; Verstegen, 2018). This amount is garnered from a combination of state aid and a required uniform tax levy for districts of $5.40 per $1,000 of taxable valuation (Iowa Department of Education, 2017; Verstegen, 2018). In addition, the state foundation formula establishes a minimum and maximum amount of money districts can receive per pupil, with the minimum at 100% and a maximum of 103% of the state cost per pupil (Iowa Department of Education, 2017).

A combination of the uniform levy and state foundation aid totals 87.5% of the state cost per pupil, which can rise annually (Iowa Department of Education, 2017). This percentage requires districts that are property rich to acquire more from local revenues and less from the state foundation aid, while less wealthy districts receive additional funds from the state foundation aid to equal 87.5% (Iowa Department of Education, 2017). The remaining 12.5% of aid is dependent on the additional tax levy generated by local districts (Iowa Department of Education, 2017).

A unique feature of the Iowa foundation formula is added funding for school districts that share teachers and programs (Verstegen, 2018). In addition, three different weighting factors are utilized for students receiving special education services, who are ELLs, or who receive gifted education services (Iowa Department of Education, 2017; Verstegen, 2018). Furthermore, weighting factors are provided for at-risk students and programs, based on a free-reduced lunch percentage of students in grades one through six (Verstegen, 2018).
Iowa falls below the national average in reducing the gap between high- and low-poverty districts. As Baker et al. (2018) noted in their School Funding National Report Card, Iowa ranked 33rd overall in 2015 state funding distribution between low- and high-poverty districts, with high-poverty districts only generating revenues at 95% of what low-poverty districts generated. This designates Iowa as being moderately regressive in funding poor students (Baker et al., 2018; Morgan & Amerikaner, 2018).

**Texas**

In 1949, the Texas legislature initiated the Minimum Foundation School Program to address inadequacies in the state’s educational funding system (Morowski, 2009). In its current iteration, the Texas Foundation School Program considers various factors including student enrollment, district size, geographical location, and local taxable property values and rates (Texas Education Agency, 2021). This program is designed to ensure that “all school districts, regardless of property wealth, receive ‘substantially equal access to similar revenue per student at a similar tax effort’” (Rolle & Wood, 2012, p. 20; Texas Education Agency, 2021, p. 1). Formula calculations are based on local revenues districts generate, with state funds providing the difference for school district allotments based on district average daily attendance (Rolle & Wood, 2012; Texas Education Agency, 2021; Verstegen, 2018; Villanueva, 2021).

Texas school district funding is based on a two-tier system. Tier One provides a foundation formula structure (Rolle & Wood, 2012) and a basic per-pupil allotment, which was $5,140 during the 2018–19 school year (Verstegen, 2018). Additionally, there are weighted adjustments in this tier for specific geographical areas, small and mid-sized school districts, free- and reduced-lunch students, special education students, and
bilingual education students (Rolle & Wood, 2012; Texas Education Agency, 2021; Verstegen, 2018). In Tier Two, revenue is generated from maintenance and operation levies set by individual districts (Rolle & Wood, 2012; Texas Education Agency, 2021; Verstegen, 2018). A combination of these two tiers provides Texas school districts’ funding.

Texas possesses a unique feature known as fiscal recapture (Rolle & Wood, 2012; Verstegen, 2018; Villanueva, 2021). As noted earlier, the state contributes aid to districts that are unable to raise necessary local funding. However, if a school district generates more revenue than the basic allotment per student, it receives no state aid and sends the excess generated revenue to the state for redistribution to other school districts (Villanueva, 2021). This allows for fiscal neutrality (Baker, 2018), ensuring state aid is distributed to the neediest districts (Rolle & Wood, 2012).

Two legislative decisions over the past 10 years have changed the course of Texas school funding. In 2011, the Texas Legislature implemented the Regular Program Adjustment Factor, designed to reduce regular program allotments over 2 fiscal years (Bigham et al., 2014). This legislation was considered especially harmful to small rural districts because funding cuts limited spending and required reductions in staffing (Bigham et al., 2014). In addition, House Bill 3 was passed in 2019, requiring school districts to decrease local tax rates once they had reached a certain level of growth, resulting in fewer local tax dollars being collected (Villanueva, 2021). This decision required the state to contribute more money to fund the formula while not increasing school district revenues (Texas Education Agency, 2021; Villanueva, 2021). As Villanueva (2021) surmised, without new revenue sources to replace reduced local tax
money, Texas may face future challenges in continuing to adequately fund its education system.

Similar to Iowa, Texas also ranks below the national average in reducing the gap between high- and low-poverty districts. As Baker et al. (2018) noted in their School Funding National Report Card, Texas ranked 36th overall in 2015 state funding distribution between low- and high-poverty districts, with high-poverty districts only generating revenues at 93% of what low-poverty districts generated. Texas is also classified as being moderately regressive in its funding for students in poverty (Baker et al., 2018; Morgan & Amerikaner, 2018).

Missouri

Missouri School Foundation Plan

Created in 1955, the Missouri School Foundation Plan was the first iteration of a specific school funding system for Missouri school districts (Shaw & Hatley, 2000). Only four calculation lines were utilized: school levy, teacher preparation level, average daily attendance, and assessed value per student (Shaw & Hatley, 2000). Although revisions were instituted in 1969 and 1977, the formula still lacked necessary funding to meet the equitable needs of Missouri students (Ko, 2006). As noted previously, the 1993 Committee for Educational Equality v. State of Missouri case was argued in the Missouri Supreme Court and determined that the Missouri School Foundation Plan was not equitable (Jackson et al., 2016; Ko, 2006; Podgursky et al., 2008; Shaw & Hatley, 2000). This decision led the Missouri Legislature to reconfigure the school funding formula model as part of the Outstanding School Act, also known as Senate Bill 380 (Monsees, 2012; Shaw & Hatley, 2000).
Senate Bill 380

Senate Bill 380 had a definitive impact on Missouri school districts, including adding provisions concerning academic performance, the creation of curriculum frameworks, an assessment system to increase accountability, and a focus on teacher development (Missouri DESE, n.d.; Missouri Governor’s Office, 1993; Taketa, 2017). In addition, the bill reconfigured a school finance formula, providing greater financial equity for Missouri school districts (Missouri DESE, n.d.; Missouri Governor’s Office, 1993; Taketa, 2017). This formula provided districts with a specific per-pupil dollar amount, based on a local tax rate (MSBA Future Builders, n.d.; Monsees, 2012). Although this change was positive for school finance equity, the state lacked the necessary money to fund the formula (Monsees, 2012).

The formula was designed to ensure those with higher local property tax revenues received less state aid, allowing the state to send additional aid to districts that lacked local financial support (Phares & Hill, 2005). This combination of local and state revenues was designed to ensure Missouri school districts received equitable amounts of aid (Phares & Hill, 2005). However, the first issue to skew the formula was districts continuing to raise their local tax levies higher than the minimum levy required (Monsees, 2012). Districts with communities that could support higher levies continued to generate additional revenues, while districts whose residents could not support increases needed additional state funding to stay equitable (Monsees, 2012). However, the dollars necessary to provide increased aid were simply not available. State allocations were not maintained, and the state was unable to continue fully funding the formula (Monsees, 2012). These withholdings in state aid affected less wealthy schools more
significantly than those with higher tax bases (Monsees, 2012; Phares & Hill, 2005). Although designed to bring funding equity to the Missouri school finance system, the inability to fund the overall formula (Monsees, 2012; Phares & Hill, 2005) increased the gap between the have and have-nots.

Another court case loomed on the horizon, this time concerning the adequacy of the Missouri school funding formula. In addition, a study commissioned by the MSBA provided dismal results highlighting the underfunding of Missouri public schools (Podgursky et al., 2008). In response to these findings and impending legislation, in 2005, the Missouri Legislature passed Senate Bill 287, reconfiguring the foundation formula once again (Monsees, 2012; MSBA Future Builders, n.d.; Podgursky et al., 2008).

**Senate Bill 287**

Implemented during the 2006–07 school year, the Missouri Foundation Formula transitioned from per-pupil funding based on a tax rate model to one based on an adequacy target, providing a specific amount of funding per pupil (Monsees, 2012; MSBA Future Builders, n.d.; Verstegen, 2014). The new formula was designed to “level the playing field between property-rich and property-poor districts” (Shuls, 2017, p. 2). This move to a more adequacy-based formula was rooted in efforts to limit the effect of local funding differences among Missouri school districts (MSBA Future Builders, n.d.; Phares & Hill, 2005; Shuls, 2017).

This new formula included four main elements, with weighted average daily attendance (WADA) as the first component. WADA is based on average student attendance, with a weighted component for students who possess specific characteristics (Monsees, 2012; Riley, 2016; Shuls, 2017). Students who receive this weighted
Local Funding and Student Success

Attendance factor are generally considered more expensive to educate (MSBA Future Builders, n.d.; Shuls, 2017). The current subgroups that receive weighted attendance factors based on a student population percentage per district include special education students, ELLs, and free- and reduced-lunch students (Missouri DESE, 2020; Riley, 2016; Shuls, 2017).

The SAT is the second component, a specific per-pupil amount deemed necessary to provide for basic student education needs (Missouri DESE, 2020; Riley, 2016; Shuls, 2017). This number is determined by the average expenses that top-performing school districts in the state, known as Performance Districts, spend during a school year (Monsees, 2012; Riley, 2016). The SAT is recalculated every 2 years (Monsees, 2012; MSBA Future Builders, n.d.; Riley, 2016) and by law cannot be decreased from a previous amount (MSBA Future Builders, n.d.). However, owing to state funding, the target has not always been met. Although the SAT should have been funded at $6,716 per pupil for the 2012–13 and 2013–14 school years, the state was unable to fully fund the formula, requiring DESE to adjust the SAT (Riley, 2016; Shuls, 2017; Taketa, 2017). During the 2018–19 school year, the SAT figure was $6,308 (Missouri Department of Education, 2021), $408 less per pupil than what was deemed necessary 6 years prior.

The third component of the formula is the dollar value modifier (DVM), which is designed to adjust for living costs in specific areas of the state (Monsees, 2012; MSBA Future Builders, n.d.; Riley, 2016; Shuls, 2017). After determining a median cost of living, those communities and school districts that require higher costs for living and expenses are provided with additional state aid (Monsees, 2012; MSBA Future Builders,
n.d.; Riley, 2016; Shuls, 2017). The WADA, SAT, and DVM are then multiplied to determine necessary state aid provided to Missouri school districts.

The fourth component is local effort and is based on local district funding amounts collected during the 2004–05 school year (Missouri DESE, 2020; Monsees, 2012; Shuls, 2017). Local effort is then subtracted from the overall sum from the other three formula components, and the amount of state aid for each school district is computed (Monsees, 2012; Riley, 2016; Shuls, 2017). Utilizing local effort in the formula helps ensure those districts that generated more money through local funding received less state aid than those with lower tax bases (MSBA Future Builders, n.d.). Though the other three component figures fluctuate, the local effort total remains fixed from the 2004–05 school year total (MSBA Future Builders, n.d.; Riley, 2016; Shuls, 2017).

A “hold harmless” provision was also implemented, guaranteeing school districts would not receive less state funding than what was received during the 2005–06 school year (Monsees, 2012; MSBA Future Builders, n.d.). This amount has assured smaller schools, especially in rural districts, that declining enrollments would not decrease the amount of state aid received (Herrold, 2018; Monsees, 2012; MSBA Future Builders, n.d.). Hold harmless designation is fluid and can change monthly. To determine hold harmless districts, the state calculates aid based on current data and compares it to what the school district received in 2005–06, with the district receiving the higher of the two amounts (MSBA Future Builders, n.d.).

**Missouri School District Funding Sources**

Like other states, Missouri school districts receive funding from three main sources: federal, state, and county and local revenues that constitute overall local revenue
McShane, 2016; Missouri DESE, 2020). These funding sources combined provide the total school district revenues available. Though district percentages vary, during the 2018–19 school year, Missouri schools received an average of 9.93% in federal funding, 43.0% was collected in state aid, and local funding accounted for 47.07% of district revenues (Missouri DESE, 2021f).

**Federal**

Federal funding varies among school districts based on student enrollment, population characteristics of students and the community, and available grant opportunities. The largest federal revenue amounts for districts are garnered through Title funding, the Individuals with Disabilities Act (IDEA) funding, and school food services (Missouri DESE, 2020; Tramel & Lehmen, 2017). Whereas data for IDEA funding are based on school district special education counts, Title and school food services funding is determined by district free- and reduced-lunch percentages (Domina et al., 2018; Petrilli, 2021). Because this information is dependent on family income data, the necessity of families completing this information honestly and turning in completed paperwork directly affects the federal funding amount school districts receive.

**State**

The Missouri Basic Foundation Formula accounts for the bulk of state funding and possesses two components: state monies and the Classroom Trust Fund (Missouri DESE, 2020). The Classroom Trust Fund is collected from gaming revenues and distributed in combination with state monies to provide the total amount of formula aid required for each school district (Missouri DESE, 2020; Tramel & Lehmen, 2017). In addition to formula monies, additional funding for transportation, early childhood special
education, Parents as Teachers, and vocational/at-risk programs provide money for districts (Missouri DESE, 2020). Additionally, schools with an enrollment of fewer than 350 students are provided with additional funds through the Small Schools Grant (Missouri DESE, 2020).

Local

As noted previously, most local funding is garnered through property taxes (Baker, 2018; Barnett & Kasmin, 2016). In Missouri, another large revenue contributor is Proposition C funding, which is generated from a one-cent statewide sales tax (Missouri DESE, 2020). Proposition C revenue is collected locally, transferred to the state, and then distributed to districts based on their WADA from the prior year (Missouri DESE, 2020; Tramel & Lehmen, 2017). Smaller local revenue amounts are collected from various taxes, including Financial Institution (Intangible) taxes, Merchants and Manufacturer’s surtaxes, and In Lieu Of taxes. (Missouri DESE, 2020). In addition, rural school districts with a utility or railroad existence also generate State Assessed Railroad and Utilities funding (J. Rinehart, personal communication, October 27, 2021). Finally, county fines provide additional local revenues (Missouri DESE, 2020). Figure 3 provides a visual representation of funding sources for Missouri school districts.
Figure 3

*Missouri School District Revenue Streams*

Compared to other states, Missouri ranks near the bottom when discussing state funding for low- and high-poverty districts. As Baker et al. (2018) noted in their School Funding National Report Card, Missouri ranked 44th overall in 2015 state funding distribution between low- and high-poverty districts, with high-poverty districts generating revenues at 84% of what low-poverty districts generated. Missouri is also classified as being moderately regressive in its funding for students in poverty (Baker et al., 2018; Morgan & Amerikaner, 2018). This lack of state support for impoverished school districts continues to necessitate districts exploring ways to increase local revenues, which may be challenging owing to low community wealth.

**Summary**

The reliance on local funding continues to increase for Missouri school districts. During the 2019–20 school year, the amount of state aid decreased significantly from
2018–19 levels, accounting for only 40.74% of district revenues, while the local percentage increased to 48.19% (Missouri DESE, 2021f). In a recent report from Missouri State Auditor Nicole Galloway, Missouri ranked 49th in the nation in state funding for school districts, emphasizing the burden school districts have in relying on local funding (Gerber, 2021). The impetus for determining whether there is a difference in rural Missouri public school success percentages on the 2019 seventh-grade MAP mathematics assessments based on levels of low, medium, and high levels of local funding support will encourage district leaders and state policymakers to consider the impact local funding has on rural public school student education.

**Rural Public School Education**

Depending on the classifying government agency, the definition of rural communities and school districts varies (Bradley et al., 2012; Robson et al., 2019; Tieken & Montgomery, 2021). Often rural school districts form the center of rural communities. Schools are often the largest employer while serving as the gathering hub for events, and their students represent the future dreams of the community (Bigham et al., 2014; Hatton et al., 2017; Tieken & Montgomery, 2021).

Based on 2013 NCES statistics, 57% of school districts nationwide are rural (Irvin et al., 2020). This figure represents over nine million students in rural school settings, including schools that are part of nonrural districts (Hatton et al., 2017; Showalter et al., 2019; Strange, 2011; Walker, 2019), equating to approximately 20% of U.S. students attending rural schools (AASA, 2017; Bigham et al., 2014; Brenner, 2016; Robson et al., 2019; Showalter et al., 2019). Unfortunately, federal and state legislators regularly focus on suburban and urban education needs, ignoring the unique challenges of rural education
Policies and funding decisions are created based on what is best for urban areas, creating challenges and deficits rural school districts struggle to overcome (Bryant, Jr., 2010; Dayton, 2003; Eady & Zepeda, 2007; Lavalley, 2018; Walker, 2019).

Missouri’s rural student numbers mirror the national average in that 21% attend a rural public school (Shelton, 2019; Showalter et al., 2019). In their report on rural education utilizing United States Census Bureau figures, Showalter et al. (2019) stated that over 43% of Missouri school districts are rural, accounting for just under 200,000 students. Shelton (2019) published even larger figures, stating that 70% of Missouri school districts are rural. Either way, the amount of rural Missouri students and school districts affected by legislative policies and state funding decisions is worthy of further study.

**Rural School District Funding**

A significant challenge for rural school districts is funding inequities compared to larger districts. Rural school districts average higher per-pupil costs than larger districts yet receive less overall funding from all three revenue sources (AASA, 2017; Bigham et al., 2014; Dhaliwal & Bruno, 2021; Johnson et al., 2012; Rauscher, 2020). Federal dollars disseminated through competitive grants provide less funding to rural districts than suburban or urban districts (Brenner, 2016; Bryant, Jr., 2010). Bryant, Jr. (2010) noted that 9% of rural budgets are covered by federal funds, whereas federal funds contribute 11% of urban district revenues. Fishman (2015) stated that the two main federal grants created for rural schools only provide a total of $121 per pupil annually. Rural districts are disadvantaged by trying to comply with government regulations and policies while
dealing with infrastructures, attracting and retaining quality teachers, and have staff needs unique to each rural locale (Bigham, 2014; Bryant, Jr., 2010; Dhaliwal & Bruno, 2021; Rinehart, 2016; Stoddard & Toma, 2021).

Student enrollment figures and local property tax bases are two significant factors accounting for rural school district funding challenges. State formulas are heavily based on average student daily attendance (Missouri DESE, 2020; Monsees, 2012; Riley, 2016; Shuls, 2017; Verstegen, 2018). In Missouri, the hold harmless provision provides a cushion from revenue cuts for rural schools suffering declining enrollment (Herrold, 2018; Monsees, 2012). However, not all states have this safeguard, and school districts face shrinking revenues caused by declining enrollment (Bigham et al., 2014; Rauscher, 2020; Robson et al., 2019). Nationwide, an average of only 17% of total state education funds are dispersed to rural school districts (AASA, 2017; Tieken & Montgomery, 2021).

Local economies and unequal distribution of community resources affect rural school districts as well. Property taxes account for over 62% of local revenues (Baker & Corcoran, 2012; Bowling et al., 2019). Districts that possess higher assessed valuations (AV) generate more money per pupil (Baker & Corcoran, 2012; Bowling et al., 2019; Glenn, 2009; Jackson et al., 2015; Verstegen & Jordan, 2009). However, rural districts generally have much lower AV and struggle to generate necessary local funding (Baker, 2017; Baker et al., 2020; Evans et al., 2020; Lavalley, 2018).

These facts hold true for rural Missouri school districts. Showalter et al. (2019) noted that only 24.2% of Missouri state funding is distributed to rural districts. Although these districts are larger per square mile than their suburban and urban counterparts, Missouri farmland is taxed at a lower rate (McShane, 2016). Commercial property is
taxed at a 32% rate, residential property at a 19% rate, and agricultural land at only a 12% rate (McShane, 2016). Based on school spending figures that McShane (2016) acquired from DESE statistics, on average urban districts have around $130,000 in AV per student, while rural districts average $88,000 in AV per student. In addition, urban per-pupil spending in Missouri averages $10,271, while rural districts average $9,572 (McShane, 2016). In Missouri, where local funding is the predominant funding source, local revenues, or lack of, significantly affect rural Missouri school districts (McShane, 2016; Riley, 2016; Shuls, 2017).

**Rural Education and Teachers**

Rural school districts struggle to attract, train, and retain high-quality teaching staff owing to a variety of factors (Irvin et al., 2020; Kominiak, 2018; Malloy & Allen, 2007; Robson et al., 2019; Tieken & Montgomery, 2021). Rural districts are often located far from large metropolitan areas, limiting the pool of qualified applicants (Brownell et al., 2018; Irvin et al., 2020; Walker, 2019). Smaller staff sizes increase the impact of teachers leaving the district or cause difficulties in filling openings (Kominiak, 2018; Malkus et al., 2015; Ulferts, 2015, 2016). Higher turnover rates and difficulties filling vacancies affect more than just expenses in obtaining and training new staff (Lavalley, 2018; Mollenkopf, 2009; Ronfeldt et al., 2013; Ulferts, 2015, 2016). In the wake of increased federal policies and accountability measures, efforts to ensure high-quality staffing compete with other infrastructure needs (Bryant, Jr., 2010; Fishman, 2015).

Teacher salaries and staff with advanced educational degree attainment are also a significant concern for rural districts because spread-thin revenues prohibit increasing salaries to compete with larger districts (Hatton et al., 2017; Irvin et al., 2020; Tieken &
Montgomery, 2021). Based on the 2011–12 NCES Schools and Staffing Survey, rural teacher salaries averaged $33,200, while those in suburban areas earned $40,500 (Latterman & Steffes, 2017). This salary difference contributes to higher teacher attrition rates, with rural districts experiencing an annual average 8.4% attrition rate, higher by a full percentage point than those in suburban districts (Latterman & Steffes, 2017).

Furthermore, Coopersmith (2009) noted that the number of teachers in rural public schools who possessed a master’s degree was more than 10% lower than that of suburban teachers.

In addition, a lack of proximity and access to available professional development limits rural teachers’ growth opportunities (Kominiak, 2018; Lavalley, 2018; Mollenkopf, 2009; Walker, 2019). Opportunities to attend training and collaborate with other same-subject peers are limited in rural districts owing to distance and fiscal decision-making (Blanchet & Bakkegard, 2018). Although Lavalley (2018) noted that on average, teachers in rural areas possess more years of experience than their urban counterparts, they fall under the national average in years of experience of town and suburban teachers. These factors all combine to highlight the challenges and roadblocks rural school districts face in striving to provide high-quality education.

**Rural Poverty**

Rural school districts are tasked with educating larger percentages of students who live in poverty (Bouck, 2004; Bradley et al., 2012; Bryant, Jr., 2010; Logan & Burdick-Will, 2017; Robson et al., 2019). Rural counties house approximately 63% of children living in poverty, compared to 37% in urban counties (Lavalley, 2018; Schaefer
et al., 2016). The national average is just over 15% for rural school-aged children living in poverty (Showalter et al., 2019).

The issue of poverty affecting academic performance has been researched throughout the years. It is documented that high-poverty students and schools have traditionally scored lower on national assessments than their low-poverty counterparts (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018; Lavalley, 2018). However, recent gains in rural assessment results have seen students score higher than their urban peers (Lavalley, 2018). As noted by Williams and Noguera (2010), “poverty does not cause academic failure, but it is a factor that profoundly influences the character of schools and student performance” (p. 45). For rural school districts, limited resources, coupled with increased accountability requirements, have created challenges in achieving higher assessment scores for all students, specifically those with poverty status (Bradley et al., 2012; Brownell et al., 2018; Dhaliwal & Bruno, 2021; Eady & Zepada, 2007; Rauscher, 2020).

**Resident Poverty Level by County**

Another factor affecting rural education is the resident poverty level for the county in which the school district resides. The geographic location and low population of rural areas leads to a disproportionate number of people living in poverty compared to many suburban and other rural areas (Dhaliwal & Bruno, 2021; Robson et al., 2019; Strange, 2011). Although willingness is based on many factors, a lack of services, quality housing, and adequate health care, together with poor nutritional options, lead to less people being willing to live in rural locations (Bradley et al, 2012; Robson et al., 2019; Tieken & Montgomery, 2021). In addition, rural economies struggle as agricultural and
manufacturing jobs decline or move further away to larger locales (Bradley et al., 2012; Stoddard & Toma, 2021; Tieken & Montgomery, 2021). The lack of job opportunities leads to a reduction in those who are highly educated and willing to live in rural locations, which leads to lower family income and property wealth (Bradley et al., 2012; Dhaliwal & Bruno, 2021; Robson et al., 2019; Tieken & Montgomery, 2021).

As noted by Lavalley (2018), in rural communities a poverty rate that is 8% higher is evident in lower educational attainment as compared to similar suburban and urban communities with higher educational attainment. Similarly, poverty levels are higher in rural communities when compared to similar suburban and urban communities (Lavalley, 2018; Strange, 2011). This increased poverty rate also signifies more persistent poverty in rural areas, which is poverty that stretches across generations (Bradley et al., 2012; Robson et al., 2019; Tieken & Montgomery, 2021). As Tieken and Montgomery (2021) noted, “more than 85% of counties with poverty rates over 20% for at least 30 years are nonmetropolitan” (p. 8). Although difficult to study, this persistent poverty factor must be considered when analyzing student academic achievement in rural schools (Bradley et al., 2012; Jones et al., 2018; Lavalley, 2018).

**Student’s Eligibility for Free and Reduced Lunch Status**

The National School Lunch Program has provided free or reduced-price meals to students since 1946 (Domina et al., 2018). To determine program eligibility, households earning an income below 130% of the poverty income threshold qualify for free lunches (Domina et al., 2018; Petrilli, 2021; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015). Families qualifying for reduced-price meals must earn at
185% or below the poverty income threshold (Domina et al., 2018; Petrilli, 2017; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015).

Although much higher than the student poverty rate, free and reduced-price meal percentages are often utilized by educational researchers as a proxy for describing student poverty status (Domina et al., 2018; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015). This information often is the only data available to school districts in determining students’ socioeconomic status (Domina et al., 2018). Additionally, these percentages determine federal Title I funding distributions to districts, and as noted earlier, may influence weighted student counts in state school funding formulas (Domina et al., 2018). Furthermore, NCLB legislation requires states to disaggregate student assessment scores and improve student performance in a variety of categories, including for students who receive free and reduced-price meals (Darling-Hammond, 2007; Dee & Jacob, 2010; Klein, 2015). These data are often employed by researchers and pundits to examine and describe gaps in student achievement.

However, caution should be applied when using free and reduced-price lunch percentages as a proxy for student poverty status (Petrilli, 2017; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015). Not all families who qualify for the program return completed applications to school districts (The Rural School and Community Trust, 2015). In addition, families who earn too much income for free and reduced-price meals may still qualify under direct certification owing to receiving other public assistance (Petrilli, 2017). Finally, the community eligibility provision has raised free and reduced lunch numbers in school districts where 40% of students were identified through direct certification (Petrilli, 2017). In those districts, 100% of students are
considered as qualified for the program and receive free meals, skewing district socioeconomic data (Petrilli, 2017; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015).

Although no school data point perfectly represents student poverty levels, free and reduced-price meal percentages still provide the closest approximation for analyzing economically disadvantaged students and school data (Domina et al., 2018; Snyder & Musu-Gillette, 2015). The number of U.S. students qualifying for free and reduced lunch has increased significantly since the early 1980s. In 1982, the number qualifying was 32%, whereas in 2013, 51% of students were eligible (The Rural School and Community Trust, 2015; U.S. Department of Education, 2021f). In addition, 14% of rural students attend a school where over 75% of the student population receives free and reduced-price lunches (Kominiak, 2018; Lavalley, 2018; Tieken & Montgomery, 2021).

Missouri’s numbers mirror these national numbers. In the 2018–19 school year, 50.1% of Missouri students were eligible for free and reduced lunches (Missouri DESE, 2021f; NCES, 2021). In addition, the number of rural Missouri students receiving free and reduced lunches was above 50% (Robson et al., 2019; Shelton, 2019). Missouri’s eligibility percentage has risen significantly over the past 20 years from when only 35% of students qualified for free and reduced lunches during the 2000–01 school year (NCES, 2021).

**Standardized Assessments in the United States**

Various educational reforms have created accountability measures for all 50 states and their public school districts. Beginning in 1982 with A Nation at Risk, the utilization of assessments for accountability purposes has become a staple of American education.
Although states possess the overall power for measuring school districts, the federal government has played a large role in creating the blueprint for accountability and assessments.

**A Nation at Risk**

At President Ronald Reagan’s request in April 1983, public schools and their perceived failures came under the spotlight with a report published by the National Commission on Excellence in Education, entitled “A Nation at Risk: The Imperative for Educational Reform” (Good, 2010; Manno, 2018; Strauss, 2018; The National Commission on Excellence in Education, 1983). The report instigated a public outcry for the improvement and overhaul of the U.S. education system and spurred reforms that continue to influence public education (Good, 2010; Jones et al., 2018; Manno, 2018; Strauss, 2018). The report listed various ways for improving America’s schools, including recommendations on states adopting rigorous learning standards and utilizing assessments to measure student performance based on these standards (Manno, 2018; Strauss, 2018; The National Commission on Excellence in Education, 1983).

The report expanded the amount of school district data the NCES collected, including assessment results (Edupedia, 2018). Feeling both federal government and public pressure, states began to update learning standards and create assessments evaluating student performance (Edupedia, 2018; Manno, 2018). Though vilified by teachers and public education supporters, these were one-off assessments that provided data to be utilized and scrutinized in determining school district success (Edutopia, 2018). This information was often used to compare school districts within state boundaries and nationally as well (Edupedia, 2018). However, states were not required to proffer these
assessments and collect disaggregated result data until 2001, when the federal government enacted the NCLB Act (Brenner, 2016; Darling-Hammond, n.d.; Farmer et al., 2006).

No Child Left Behind

Under President George W. Bush, in 2001, the federal government enacted the NCLB Act, mandating public schools to participate in accountability methods and assessments to quantify student performance (Dodman et al., 2021; Farmer et al., 2006; Jones et al., 2018; Klein, 2015). NCLB was the largest educational reform since the 1960s, designed to boost overall student achievement and reduce achievement gaps between disaggregated groups of students (Dodman et al., 2019; Farmer et al., 2006; Skrla et al., 2004). Analyzing student performance data, including evaluating those students who live in poverty, was hailed as beneficial to implementing educational policy decisions at state and local level to increase equitable academic performance (Darling-Hammond, 2007; Dodman et al., 2019; Farmer et al., 2006). NCLB requirements were tied to federal funding, ensuring states and school districts would comply with the requirements (Dodman et al., 2019; Klein, 2015).

NCLB included lofty goals, including moving targets that would result in all students in grades 3–8 scoring as 100% proficient on language arts and mathematics assessments by 2014 (Darling-Hammond, 2007; Dee & Jacob, 2010; Farmer et al., 2006; Klein, 2015). School districts, and individual schools within those districts, that did not meet targets were hit with sanctions that resulted in funding reductions, school closures, or allowing students to transfer schools (Darling-Hammond, 2007; Klein, 2015). In addition to assessment results, various other categories such as attendance rates and
highly qualified teacher percentages were collected to determine AYP for school districts (Brenner, 2016; Darling-Hammond, 2007; Dee & Jacob, 2010; Farmer et al., 2006; Potter & Stefkovich, 2008; Skrla et al., 2004).

Educational researchers and critics alike have noted the challenges NCLB placed on school districts, specifically in economically disadvantaged and rural school districts (Brenner, 2016; Darling-Hammond, 2007; Farmer et al., 2006; Malloy & Allen, 2007). Those schools that truly needed additional financial support often failed to meet performance targets and were then hit with funding cuts and sanctions (Darling-Hammond, 2007; Eady & Zepeda, 2007). A culture of one-shot testing increased pressure on students and school personnel alike, focusing educational decision-making on test results (Klein, 2015; Lamb, 2007; Potter & Stefkovich, 2009). For rural schools, AYP requirements were even more impactful. One student’s performance in rural districts with smaller enrollments could influence subgroup or overall group scores (Brenner, 2016; Lamb, 2007). In addition, finding and maintaining highly qualified teaching staff was problematic for rural districts, especially those in economically deprived areas (Brenner, 2016; Brownell et al., 2018).

Although NCLB changed the landscape of U.S. education for the 21st century, it was not the final federal government intervention in current educational policies. During President Barack Obama’s term, a competitive grant and enacted legislation again changed the emphasis and accountability requirements for states and school districts. Through Race to the Top (RTT) and the Every Student Succeeds Act (ESSA), emphasis has continued in assessing student learning standards and accountability measures (Brenner, 2016; Fusarelli & Militello, 2012).
Race to the Top

As part of the American Recovery and Reinvestment Act of 2009, $43.5 billion was set aside for the RTT competitive grant (Boser, 2012; Howell, 2015). RTT did not prescribe specific educational programs, instead encouraging innovation from states in strengthening their education systems (Boser, 2012; Brenner, 2016; Howell, 2015). Although the grant awarded points in various categories, an emphasis on using common core learning standards, analyzing student achievement through standardized testing, creating state data systems, and quantifying and evaluating teacher growth were highlighted areas that became part of state education policymaking considerations (Boser, 2012; Howell, 2015; Sanchez & Turner, 2017).

Education policymaking became the focus of state-level discussions when vying for this competitive funding (Boser, 2012; Howell, 2015). Though only 18 states and the District of Columbia received the grant, the impact of education discussions was significant for many states (Boser, 2012; Howell, 2015). Howell (2015) noted that “between 2001 and 2008, states on average enacted about 10% of reform policies. Between 2009 and 2014, however, they had enacted 68%” (p. 62). Steps taken during the grant writing process benefitted state education departments and legislators in improving overall educational outcomes (Howell, 2015).

Every Student Succeeds Act

Whether or not states received RTT funding, they were still bound under NCLB guidelines and requirements. In December 2015, President Obama signed ESSA to replace NCLB (Egalite et al., 2017; U.S. Department of Education, 2021a; Wang, 2019). This law maintained many of NCLB’s premises but yielded more flexibility in decision-
making and accountability to the states (Darling-Hammond et al., 2016; Klein, 2016; Wang, 2019). ESSA required states to have their updated accountability systems in place beginning with the 2017–18 school year (Sharp, 2016).

Under ESSA, students in grades 3–8 were still required to be assessed in math and language arts, and an additional test for science was required in the elementary, middle school, and high school ages (Darling-Hammond et al., 2016; Egalite et al., 2017; Sharp, 2016). Additionally, ESSA still required collection of data based on student and subgroup results (Alexander & Jang, 2020; Egalite et al., 2017; Sharp, 2016). Unlike NCLB, however, states had the ability to add additional accountability measures to determine overall district performance, instead of simply basing it on a high-stakes assessment (Adler-Greene, 2019; Darling-Hammond et al., 2016). Instead of proficiency target scores for all school districts, ESSA required states to identify and assist their lowest-performing public schools based on district performance measures (Darling-Hammond, 2016). ESSA’s flexibility allowed state-created accountability systems not only to focus on test scores but also to consider other factors in evaluating student and school performance (Darling-Hammond et al., 2016; Egalite et al., 2017).

Missouri

Missouri Assessment Program

The MAP was created in response to the 1993 Outstanding Schools Act (Missouri DESE, 2021d). Originally this assessment measured student performance based on the Missouri Show-Me Standards (Missouri DESE, 2021d). Grade- and course-level expectations were developed from these standards to provide a framework for teacher instruction (Missouri DESE, 2021d). Currently the MAP assessment determines student
performance based on the MLS, an upgraded version of the Show-Me Standards (Missouri DESE, 2021d).

The first iteration of the MAP tested the following subjects and grade levels: communication arts in grades 3, 7, and 11; mathematics in grades 4, 8, and 10; and science in grades 3, 7, and 10 (Missouri DESE, 2021d). However, when NCLB legislation was constituted, testing began in communication arts and mathematics for grades 3–8 and once during the high school years (Missouri DESE, 2021d). In addition, science was tested once in grades 3–5, once in grades 6–9, and once in grades 10–12 (Missouri DESE, 2021d). During the 2008–09 school year, EOC assessments were instituted to replace high school MAP assessments (Missouri DESE, 2021d).

MAP and EOC results are collected, disaggregated, and reported based on federal and state requirements (Missouri DESE, 2021d). Students score in one of four categories: below basic, basic, proficient, and advanced (McShane, 2016; Missouri DESE, 2021d). The goal for Missouri schools is for 100% of students to score in the proficient and advanced categories. Overall category percentages are collected and combined with other scoring categories to determine the AYP of students as part of the MSIP (Missouri DESE, 2021d).

Missouri School Improvement Program

The MSIP is Missouri’s accountability system for determining school district accreditation (Missouri DESE, 2019b). The first cycle of this program began during the 1990–91 school year and has had five cycles (Missouri DESE, 2019b). The current version, MSIP 5, began in 2012–13; however, MSIP 6 Standards and Indicators were
approved in February 2020 and will begin implementation in future years (Missouri DESE, 2019b).

Annual Performance Reports are tabulated and publicly distributed to quantify school district performance based on five MSIP 5 categories (Missouri DESE, 2019b). These five categories are designed to measure progress toward the DESE goal that all students will graduate ready for future success (Missouri DESE, 2019b). These five MSIP 5 Performance Standards are Academic Achievement, Subgroup Achievement, High School or College and Career Readiness, Attendance Rate, and Graduation Rate (Missouri DESE, 2019b). Percentages and scale scores from the five categories are then utilized to determine school district accreditation (Missouri DESE, 2019b).

**Summary**

Federal legislation requires states to assess students in a variety of grade levels and subject areas. Student performance is tabulated and disaggregated and factors strongly in Missouri school district accreditation. In addition, these scores are trumpeted by the media and parents, often determining school district “success.” Given assessment scores are so vital, it is imperative that school district personnel and policymakers understand the impact various variables may have on the relationship between rural Missouri public school student success percentages on the 2019 seventh-grade MAP mathematics assessment.
SECTION FOUR

CONTRIBUTION TO PRACTICE

Plan for Dissemination of Practitioner Contribution


How: Through a slideshow presented during a workshop session at the MASA/MOSPRA Conference.

Type of Document

A slideshow presentation will be presented, which will inform the audience of the basis for the research study, the research discussing how funding affects student performance, and the results of the study conducted in Missouri examining local funding levels and student performance results.

Rationale for This Contribution Type

The MASA is a professional organization that serves the needs of, provides professional development opportunities for, and supports and develops legislative platforms for over 600 school superintendents and central office personnel in the state of Missouri. The largest attended event that MASA provides is the annual spring MASA/MOSPRA Conference, which provides nationally recognized guest speakers, colleague networking, and workshop sessions designed to improve and enhance the knowledge and abilities of Missouri school superintendents and central office personnel. This conference would provide the opportunity for these research study findings to reach
a large demographic of Missouri school superintendents, especially those in a rural setting.

**Outline of Proposed Contents**

- Prior Research
- Purpose of Study
- Research Questions
  - Background of National, State, and Local Funding Levels
    - National Legislation Affecting School Funding
    - Missouri Legislation Affecting School Funding
- Rural Education
  - Poverty
  - Funding/Rural School Challenges
- Theoretical Framework
  - Horizontal Equity
  - Vertical Equity
- Setting, Participants, and Data Collection
- Data Analysis
- Descriptive Statistics and Quartile Qualifications
- Findings From Research Study Comparing Variables and Student Success Percentages on the 2019 Grade 7 MAP Mathematics Assessment
  - Levels of Local Funding Support
  - Assessed Valuation
  - District Student Free/Reduced Lunch Eligibility Percentages
- Base Teacher Salary
- Per-Pupil Allotment Through Local Taxes
- Districts That Did/Did Not Receive Missouri Small School Grant Funding
- Factors Predicting Performance

- Discussion
- Conclusion
- References
Welcome; Introduction: my background, reason for completing study
Prior Research

• Coleman Report (Coleman, 1966) concluded that funding was not influential on student academic success, determining that family background and socioeconomic factors delivered the biggest impact on student learning.
• Hanushek (1986, 1996) evaluated 112 different studies, and determined that there was no “consistent relationship” between school spending and student performance (as cited in Baker, 2018, p. 35).
• However, recent research have shown that higher school funding levels accompany higher assessment scores (Baker et al, 2020; Darling-Hammond, 2019; Farrie et al, 2019; Hinojosa, 2018; Jackson et al., 2015; Lafortune et al., 2018).

-Coleman further inferred that school spending, measured by per-pupil spending, was unrelated to student outcomes on achievement tests (Baker, 2017; Coleman et al., 1996; Dickinson, 2016; Downey & Condron, 2016; Jackson et al., 2015; Rauscher, 2018).
-“Advances in data quality and statistical techniques consistently shows that money makes a difference” (Baker, 2017, p. 5).
-With increased school spending, achievement improves, “especially for students from low-income families” (Darling-Hammond, 2019, p. vi).
Purpose of Study

- Minimal information exists on the relationship of rural Missouri public school funding and student academic achievement.

- Determine whether Missouri school district local funding percentages affect standardized assessment results, based on one-year data from the 2018-19 Grade 7 MAP Mathematics assessment.

-Bartels (2014) determined that the most significant positive variable on district effectiveness, as measured by MSIP 5, was expenditures on instructional salary per pupil.
-Linthacum (2016), through a predictive model, found that total instructional resources and student free/reduced lunch levels had the strongest relationships.
-Rinehart (2016) utilized ANOVA to determine whether specific economic disparity variables affected student performance on the English I EOC, finding a strong and large effect from free/reduced lunch and a strong and small effect size based on assessed valuation and household income.
Prior to the 1970’s, school funding was primarily raised at the local level via property taxes (Jackson et al., 2016; Verstegen, 2011).

During the past 40 years, numerous lawsuits have changed the method states fund local school districts.

- 46 states currently utilize a foundation formula model (Verstegen, 2014).
- Foundation formulas have two objectives (Baker, 2017; Sciarra & Hunter, 2015):
  - Determine the amount of state revenue provided to local school districts
  - Determine the extent to which districts can raise local tax money

- Strange (2011) noted there “are truly 50 unique systems” for funding depending on the state and its model (p. 12)

- Formulas initially focused only on paying the same amount per student, providing horizontal equity (Johnson & Vesely, 2017; Toutkoushian & Michael, 2008; Verstegen, 2015).

- Formulas now focus on providing additional resources based on student educational needs, often through weighted student counts or specific student population percentages, providing vertical equity (Baker, 2018; Johnson & Vesely, 2015; Verstegen, 2015).
- 1972 *Robinson v Cahill* (New Jersey) ushered in equity finance reform cases, considering whether the state was negligent in providing an equitable education to all students (Banicki & Murphy, 2014; Koski, 2018; Minorini & Sugarman, 1999).
- 1979 *Pauley v Kelly* (West Virginia) was instrumental in providing financial equity focus on high-poverty areas, especially rural school districts; it required the state to provide additional resources to high-poverty areas to ensure equitable education opportunities (Bordas & Bordas, 2019).
- 1993 *McDuffy v Secretary of Education* (Massachusetts) initiated the creation of a foundation formula that adjusted allocations based on higher educational needs for poverty students, ELLs, and students who required special education services (Baker, 2018; Darling-Hammond, 2019).
School Funding on a National Level

- While educational costs and accountability measures increase, funding levels have remained steady.
- Baker et al. (2020) notes the "share of a state's economic capacity spent on K-12 school is now at its lowest point since 1982" (p. 10).

<table>
<thead>
<tr>
<th></th>
<th>1996–97 School Year</th>
<th>2014–2015 School Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Funding</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>State Funding</td>
<td>45%</td>
<td>46%</td>
</tr>
<tr>
<td>Local Funding</td>
<td>48%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Sources: Augenblick et al., 1997; Baker et al., 2018; Farrie et al., 2019; Hinojosa, 2018

-School funding is the largest amount of money allocated in many states (Baker, 2018).
-In 2015, 29 states proffered less school funding than in 2008 (Leachman et al., 2017).
-These shortfalls require school districts to increasingly utilize local funding to fulfill a myriad of accountability requirements (Baker, 2018; Darling-Hammond, 2019).
Missouri School Finance Litigation

- 1993- Committee for Educational Equality v. Missouri- Missouri Supreme Court ruled the school finance system at that time was not equitable.
- Lead to Senate Bill 380 and the Outstanding Schools Act
  - New formula strived to lessen gap between property-rich and property-poor districts
  - Hold Harmless provision created
- 2003- MSBA commissioned a study by Augenblick and Myers which strived to determine an adequate level of funding necessary for Missouri school districts
- Senate Bill 287- updated the formula with a State Adequacy Target (SAT)

-Missouri was “the worst state in school finance equity in the early 1990s, measured by selected equity indices” (Ko, 2006, p. 559).
-New formula strived to equalize financial resources between property-rich and property-poor districts (Monsees, 2012; Podgursky et al., 2008)
-SB 287- created SAT, considered to be the adequate spending level necessary per student and designed to be recalcultated and raised every 2 years (Monsees, 2012; Podgursky et al., 2008).
-2006–07 Missouri Foundation Formula transitioned from per-pupil funding based on a tax rate model to one based on an adequacy target, providing a specific amount of funding per pupil (Monsees, 2012; MSBA Future Builders, n.d.; Verstegen, 2014). This move to a more adequacy-based formula was rooted in efforts to limit the effect of local funding differences among Missouri school districts (MSBA Future Builders, n.d.; Phares & Hill, 2005; Shuls, 2017).
Local Level Funding

- Most public-school funding is raised at the local level via property taxes (Jackson et al., 2015; Raikes & Darling-Hammond, 2019).

- Districts with higher tax bases generate more revenue.

- In Missouri, Proposition C is another large contributor, which is generated from a one-cent statewide sales tax (Missouri DESE, 2020).

-Districts with higher tax bases generate more revenue than those in higher-poverty districts can acquire (Morgan & Amerikaner, 2018; Raikes & Darling-Hammond, 2019).

-“The highest poverty school districts receive about $1,000, or 7%, less per pupil in state and local funding than the lowest poverty districts” (Morgan & Amerikaner, 2018, p. 6).
Rural Education and Poverty

- Rural school districts educate over nine million students, which equates to 20% of U.S. students attending rural schools (Showalter et al., 2019).
- 50% of U.S. public-school districts are rural (Brenner, 2016).
- Rural counties house approximately 63% of children living in poverty (Lavalley, 2018; Schaefer et al., 2016).
- National average is over 15% for rural school-aged children living in poverty (Showalter et al., 2019).
- “Poverty does not cause academic failure, but is a factor that profoundly influences the character of schools and student performance” (Williams & Noguera, 2010, p. 45).

In Missouri, 21% of students attend a rural public school, mirroring the national average (Shelton, 2019; Showalter et al., 2019).

High-poverty schools and students have traditionally scored lower on national assessments than their low-poverty counterparts (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018).
- Rural school districts average higher per-pupil costs than larger districts yet receive less overall funding from all three revenue sources (AASA, 2017; Bigham et al., 2014; Dhaliwal & Bruno, 2021; Johnson et al., 2012; Rauscher, 2020).
- Rural districts generally have much lower assessed valuation (AV) and struggle to generate additional or necessary funding (Baker, 2017; Baker et al., 2020; Evans et al., 2020; Lavalle, 2018).
Theoretical Framework:
Horizontal and Vertical Equity

• 1979- Berne and Stiefel created a framework of equity and fairness for school finance systems
• Two main framing questions:
  • Equity of what?
    • Focus on money, how much a state could/should allocate to ensure fair educational opportunities
  • Equity for who?
    • Typically involves students and taxpayers

-Equity of what- Baker (2018) suggested equity “could be framed in terms of financial inputs to schools, real resource inputs (such as teachers and their qualifications), and outcomes” (p. 21).

-Equity of who- Berne and Stiefel specified that a “state school finance system should be based on fair treatment of taxpayers and yield fair treatment of students” (as cited in Baker, 2018, p. 21).
Horizontal equity is present when every district receives the same amount per pupil because it is assumed all students are the same (Baker, 2018; Johnson & Vesely, 2017; Verstegen, 2015).
- Weighted counts often include free and reduced lunch percentages, special education populations, ELL students, and foster care or homeless students (Hinojosa, 2018; Johnson & Vesely, 2017).
Research Questions

- RQ 1: What are the descriptive statistics for rural Missouri school districts during the 2018-19 school year considering Grade 7 MAP mathematics assessment results, local funding support, local assessed valuation, student free/reduced lunch eligibility, district base teacher salary, maximum per pupil allotment through local taxes, districts who did/did not receive DESE Small Schools Grant funding, and factors that predict performance on the assessment?

- RQ 2: Is there a difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural districts and levels of local funding support?
Research Questions Continued

- RQ 3: Is there a difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment when considering rural Missouri public school districts and assessed valuation?
- RQ 4: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages?
- RQ 5: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and district base teacher salary?
Research Questions Continued

- RQ 6: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per pupil allotment through local taxes?
- RQ 7: Is there a difference between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and districts who receive/did not receive DESE Small Schools Grant funding?
- RQ 8: What factors predict performance on the 2019 Grade 7 MAP mathematics assessment?
268 rural Missouri public K-8 and K-12 school districts initially selected.
- Rural classification determined by those who received SRSA/REAP funding for the 2019 fiscal year
- Seventh Grade students who completed the 2019 MAP Mathematics assessment.
- Data collected from secondary sources (Mertens, 2020) including:
  - DESE Missouri Comprehensive Data System District Report Card (2018-19 school year)
  - U.S. Department of Education SRSA web page
  - MSTA Missouri Salary Schedule and Benefits Report (2018-19 school year)

-Districts qualified for SRSA/REAP funding by meeting two standards:
  “total average daily attendance is less than 600; or each county in which a school served by the LEA has a total population density of less than 10 people per square mile” (U.S. Department of Education, n.d.a.), and,
  “schools have a locale code of 41, 42, or 43 determined by the Secretary of Education; or the district is located in an area deemed rural by a State governmental agency” (U.S. Department of Education, n.d.a.).
Data Analysis

- Quartile qualification were utilized dividing the data into four groups, allowing for comparisons (Field, 2018).
- One-way ANOVA analyses were conducted for research questions #2-6 to determine whether there were significant differences between quartiles (Field, 2018).
- For ANOVA results that registered a significant difference, Tukey's HSD was conducted to determine whether there were significant differences among sample means (Field, 2018).
- Research question #7 utilized a t-test comparing the means of two groups to determine whether there was a significant difference (Field, 2018).
- A multiple linear regression was conducted on research question #8 to ensure that significant differences were accurate.

Utilized a Microsoft Excel spreadsheet, then data were imported into IBM SPSS Statistics for analysis.
### Research Question #1
Descriptive Statistics

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<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>K-12 Enrollment</td>
<td>214</td>
<td>304</td>
<td>148</td>
</tr>
<tr>
<td>Grade 7 Math Prof &amp; Adv %</td>
<td>214</td>
<td>36.9%</td>
<td>17.1%</td>
</tr>
<tr>
<td>Local Revenue %</td>
<td>214</td>
<td>47.5%</td>
<td>11.4%</td>
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<tr>
<td>Assessed Valuation</td>
<td>214</td>
<td>$30,627,894</td>
<td>$23,795,317</td>
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<tr>
<td>Free/Reduced Lunch %</td>
<td>214</td>
<td>56.9%</td>
<td>18.8%</td>
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<td>Base Salary</td>
<td>214</td>
<td>$30,758</td>
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<tr>
<td>Per Pupil Allotment per Tax Levy</td>
<td>214</td>
<td>$4,206.84</td>
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<tr>
<td>Tax Levy</td>
<td>214</td>
<td>$4.08</td>
<td>$0.74</td>
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### Quartile Qualifications

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<th>Variable</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
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<td>Local Revenue %</td>
<td>39.5%</td>
<td>46.4%</td>
<td>53.4%</td>
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<tr>
<td>Assessed Valuation</td>
<td>$15,932,549</td>
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<td>44.4%</td>
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<td>Base Salary</td>
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<td>$2,759.51</td>
<td>$3,681.31</td>
<td>$4,951.07</td>
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</tbody>
</table>
Research Question #2
Findings: Levels of Local Funding Support

-A one-way ANOVA was conducted to determine if there were differences between the variables.
-No statistically significant results were found (p = 0.465).
-The researcher accepted the null hypothesis for these differences.
Research Question #3
Findings: Assessed Valuation

-A one-way ANOVA was conducted to determine if there were differences between the variables.
-No statistically significant results were found (p = 0.951).
-The researcher accepted the null hypothesis for these differences.
Research Question #4
Findings: Free/Reduced Lunch Eligibility

- A one-way ANOVA was conducted to determine if there were differences between the variables.
- Statistically significant results were found (p = 0.006) between quartile 1 (those with the lowest percentage of free/reduced lunch students) and quartile 4 (those with the highest percentage of free/reduced lunch students).
- A post hoc Tukey HSD was performed. This showed that the only significant difference was between school districts in quartile 1 and school districts in quartile 4.
- No statistically significant results were found when comparing those to quartiles 2 and 3.
Research Question #5
Findings:
Base Teacher Salary

-A one-way ANOVA was conducted to determine if there were differences between the variables.
-No statistically significant results were found (p = 0.723).
-The researcher accepted the null hypothesis for these differences.
A one-way ANOVA was conducted to determine if there were differences between the variables.
- Statistically significant results were found ($p = 0.023$) between quartile 1 (those with the lowest amount of per-pupil allotment through local taxes) and quartile 4 (those with the highest amount of per-pupil allotment through local taxes).
- A post hoc Tukey HSD was performed. This determined that school districts in the quartile 1 performed significantly lower than school districts in quartile 4.
- No statistically significant results were found when comparing those to quartiles 2 and 3.
- An independent samples $t$-test was conducted to compare school districts.
- No statistically significant difference was determined $t(212) = .414, p = .68$.
- The researcher accepted the null hypothesis for these differences.
Research Question #8 Findings
Factors Predicting Performance

- Collinearity diagnostics were performed on the two potential independent variables.
- Linear regression was run with both independent variables—results determined that free and reduced lunch was a significant predictor in the model, while per pupil allotment through taxes was not.
- Linear regression was then run utilizing only the quartiles of free and reduced lunch as the predictor. Results still show a significant effect on math proficiency, and quartiles were still significant in the model.

-Free and reduced lunch was a significant predictor in the model ($t = -3.109, p = .002$).
- Per-pupil allotment through taxes was not a significant predictor ($t = .880, p = .380$).
- When ran with only free and reduced lunch, still a significant predictor ($t = -3.837, p < .001$).
- It is well documented that high-poverty students and schools have traditionally scored lower on national assessments than their low-poverty counterparts (Bryant, Jr., 2010; Jones et al., 2018).
- Study findings support prior research due to students in schools with the highest percentage of free/reduced lunch percentages performing lower.
- As noted by Williams and Noguera (2010), “poverty does not cause academic failure, but it is a factor that profoundly influences the character of schools and student performance” (p. 45).
- Although states’ funding formulas currently provide more vertical equity than before, local revenues continue to perpetuate funding gaps that high-poverty school districts struggle to overcome (Baker, 2018; Raikes & Darling-Hammond, 2019; Verstegen, 2014).
- Study findings support prior research that funding formulas and local tax revenues may negatively impact student achievement, especially in high-poverty school districts.
Conclusion

- **School Finance**: While reliance on local revenues continues to rise in Missouri, results show those with higher tax bases perform better. Policymakers and researchers must determine whether state school funding mechanisms, especially in Missouri, necessitate modifications.

- **Rural Public School Education**: Concern with the increasing number of students qualifying for free and reduced lunch. Policymakers must determine what factors outside of the school building can be enacted to help families break the poverty cycle.

- **Standardized Assessments**: This study only included one grade, one subject level, and one state. Further research must be conducted considering additional variables that may affect student academic and assessment performance.

- Although state school funding reforms have been focused on shrinking the gap between property-rich and property-poor districts, local funding and property taxes remain a significant component of school district revenues (Baker, 2018; Bowling et al., 2019; Raikes & Darling-Hammond, 2019; Verstegen, 2011).

- Rural school districts are tasked with educating larger percentages of students who live in poverty (Bouck, 2004; Bradley et al., 2012; Bryant, Jr., 2010; Logan & Burdick-Will, 2017; Robson et al., 2019).

- Policies and funding decisions are created based on what is best for urban areas, creating challenges and deficits rural school districts struggle to overcome (Bryant, Jr., 2010; Dayton, 2003; Eady & Zepeda, 2007; Lavalle, 2018; Walker, 2019).

- What can Superintendents do with this information?
  - Talk to legislators about the effects of revenues on student achievement.
  - Consider possible mechanisms locally to helps increase assessed valuation and increasing tax levies.
References


References


References


References


SECTION FIVE

CONTRIBUTION TO SCHOLARSHIP

Target Journal

The target journal for publication is *Theory & Practice in Rural Education*, which is published by East Carolina University.

**Rationale for This Target**

*Theory & Practice in Rural Education* is a peer-reviewed journal published electronically twice a year. The journal is focused on research and studies related to educational practices in rural education, including issues related to distinct rural populations. All manuscripts are subject to double blind peer review.

**Outline for Proposed Contents**

All manuscripts are to follow APA guidelines and should be between 5,000 and 7,500 words, not including figures, captions, or references.

- Abstract (approximately 150 words)
- Keywords (five)
- Introduction
- Literature Review
- Theoretical Framework
- Methodology
- Findings
- Discussion
- Conclusion
- References
Plan for Submission

Who: East Carolina University *Theory & Practice in Rural Education*

When: Fall 2022

How: Submissions are downloaded via the website at [http://tpre.ecu.edu](http://tpre.ecu.edu)
Abstract

School finance formulas vary from state to state, impacting school district educational outcomes. Rural school districts are especially affected due to inherent challenges in producing high student achievement scores. This study examined whether variables including socioeconomic status and per-pupil local tax level impacted student achievement percentages on the Missouri Assessment Program (MAP) Mathematics assessment given Spring 2019. For this quantitative research, one-way ANOVA and multiple regression analyses were utilized. While ANOVA results indicated that student free and reduced lunch percentages and per pupil allotment from local taxes both have statistically significant effects on student achievement, multiple regression analyses indicated only free and reduced lunch was a significant predictor in the model. Recommendations for further research include examining reasons Missouri free and reduced lunch percentages continue to rise and conducting a similar study with differing grade levels and subject levels to determine whether results remain consistent.

Keywords
school finance, rural education, standardized testing, middle school, mathematics

Introduction

School finance is a topic that is frequently discussed, examined, and compared both with other countries and within the United States. Most public school funding is raised at the local level via property taxes (Jackson et al., 2015; Raikes & Darling-Hammond, 2019). During the past 40 years, numerous school districts have filed lawsuits in various states arguing that public schools do not receive the necessary funding at state levels to provide equitable, adequate, and quality education (Baker & Corcoran, 2012;
Glenn, 2009; Sweetland, 2012). A local example is the 2005 Montoy v. Kansas lawsuit, which led the Kansas Supreme Court to mandate an increase in state aid to school districts (Baker, 2018; Zeff, 2015). Similar litigation has spurred states to create their own funding systems, with the majority utilizing a foundation formula model (Baker, 2018; Verstegen & Jordan, 2009), determining the amount of state funding provided and what is then expected or allowed from local resources (Farrie et al., 2019). This study will investigate whether variables related to public school finance, property value and assessed valuation, teacher base salaries, grant funding, and/or student eligibility for free and reduced lunch impact academic learning on a state seventh grade mathematics assessment. These factors are under-researched and developed this study’s research questions.

**Research Questions**

The two research questions that guided the study were:

1) Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages?

2) Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per pupil allotment through local taxes?

**School Finance in the United States**

Modern school finance formulas are designed to achieve two objectives: 1) determine the amount of state revenue provided to local school districts; and 2) determine
the extent to which districts can raise local tax money (Baker, 2017; Sciarra & Hunter, 2015). These formulas incorporate state aid amounts provided to districts; however, this number varies from state to state (Baker, 2018; Toutkoushian & Michael, 2008; Verstegen, 2014). State formulas also provide different factors and complexities, creating what Baker and Corcoran (2012) termed policy levers. Initially these formulas were focused on paying the same amount per student, providing horizontal equity (Johnson & Vesely, 2017; Toutkoushian & Michael, 2008; Verstegen, 2015). This amount-per-pupil figure varies among states (Baker, 2018; Verstegen, 2014).

State finance formulas have been modified to attempt vertical equity, focusing on providing additional financial resources based on student educational needs (Baker, 2018; Johnson & Vesely, 2015; Mathis, 2001; Toutkoushian & Michael, 2008; Verstegen, 2015). This is often accomplished through weighted student counts or through categorical aid amounts based on a specific student population percentage (Hinojosa, 2018). Once again state methodologies and figures vary; however, the focus remains on ensuring states provide an equitable education to all students (Banicki & Murphy, 2014; Koski, 2018; Verstegen, 2014).

**State Funding Systems**

Without a federal mandate for funding school districts, states are responsible for implementing a funding mechanism that provides an equitable and adequate education for students. All 50 states have differing methodologies, systems, and figures meeting those requirements (Strange, 2011; Toutkoushian & Michael, 2008). Most states distribute funds based on a structured funding formula (Bowling et al., 2019; Darling-Hammond, 2019; Johnson & Vesely, 2017; Verstegen & Jordan, 2009). Of the 50 states,
37 use a foundation formula, nine employ a combination/tiered system through their formula, two base their funding on various tax rates, North Carolina offers a flat grant, and Hawaii is the only state that fully collects and distributes funding (Verstegen, 2014). These formulas incorporate various methods of accounting for student characteristics that require additional funding support, in addition to providing specific funding amounts per pupil (Baker, 2018; Verstegen, 2014).

**Missouri School District Funding**

Implemented during the 2006–07 school year, the Missouri Foundation Formula transitioned from per-pupil funding based on a tax rate model to one based on an adequacy target, providing a specific amount of funding per pupil (Monsees, 2012; MSBA Future Builders, n.d.; Verstegen, 2014). The new formula was designed to “level the playing field between property-rich and property-poor districts” (Shuls, 2017, p. 2). This move to a more adequacy-based formula was rooted in efforts to limit the effect of local funding differences among Missouri school districts (MSBA Future Builders, n.d.; Phares & Hill, 2005; Shuls, 2017).

This new formula included four main elements, with weighted average daily attendance (WADA) as the first component. WADA is based on average student attendance, with a weighted component for students who possess specific characteristics (Monsees, 2012; Riley, 2016; Shuls, 2017). Students who receive this weighted attendance factor are generally considered more expensive to educate because their educational needs usually require additional services (MSBA Future Builders, n.d.; Shuls, 2017).
The SAT is the second component, a specific per-pupil amount deemed necessary to provide for basic student education needs (Missouri DESE, 2020; Riley, 2016; Shuls, 2017). This number is determined by the average expenses that top-performing school districts in the state, known as Performance Districts, spend during a school year (Monsees, 2012; Riley, 2016). The SAT is recalculated every 2 years (Monsees, 2012; MSBA Future Builders, n.d.; Riley, 2016) and by law cannot be decreased from a previous amount (MSBA Future Builders, n.d.).

The third component of the formula is the dollar value modifier (DVM), which is designed to adjust for living costs in specific areas of the state (Monsees, 2012; MSBA Future Builders, n.d.; Riley, 2016; Shuls, 2017). After determining a median cost of living, those communities and school districts that require higher costs for living and expenses are provided with additional state aid (Monsees, 2012; MSBA Future Builders, n.d.; Riley, 2016; Shuls, 2017). The WADA, SAT, and DVM are then multiplied to determine necessary state aid provided to Missouri school districts.

The fourth component is local effort and is based on local district funding amounts collected during the 2004–05 school year (Missouri DESE, 2020; Monsees, 2012; Shuls, 2017). Local effort is then subtracted from the overall sum from the other three formula components, and the amount of state aid for each school district is computed (Monsees, 2012; Riley, 2016; Shuls, 2017). Utilizing local effort in the formula helps ensure those districts that generated more money through local funding received less state aid than those with lower tax bases (MSBA Future Builders, n.d.). Though the other three component figures fluctuate, the local effort total remains fixed from the 2004–05 school year total (MSBA Future Builders, n.d.; Riley, 2016; Shuls, 2017).
A “hold harmless” provision was also implemented, guaranteeing school districts would not receive less state funding than was received during the 2005–06 school year (Monsees, 2012; MSBA Future Builders, n.d.). This amount has assured smaller schools, especially in rural districts, that declining enrollments would not decrease the amount of state aid received (Herrold, 2018; Monsees, 2012; MSBA Future Builders, n.d.). To determine hold harmless districts, the state calculates aid based on current data and compares it to what the school district received in 2005–06, with the district receiving the higher of the two amounts (MSBA Future Builders, n.d.). In addition to funding concerns, rural school districts have unique challenges and opportunities for learning.

**Rural Public School Education**

Depending on the classifying government agency, the definition of rural communities and school districts varies (Bradley et al., 2012; Robson et al., 2019; Tieken & Montgomery, 2021). Often rural school districts form the center of rural communities. Schools are often the largest employer while serving as the gathering hub for events, and their students represent the future dreams of the community (Bigham et al., 2014; Hatton et al., 2017; Tieken & Montgomery, 2021).

Based on 2013 NCES statistics, 57% of school districts nationwide are rural (Irvin et al., 2020). This figure represents over nine million students in rural school settings, including schools that are part of nonrural districts (Hatton et al., 2017; Showalter et al., 2019; Strange, 2011; Walker, 2019), equating to approximately 20% of U.S. students attending rural schools (AASA, 2017; Bigham et al., 2014; Brenner, 2016; Robson et al., 2019; Showalter et al., 2019). Unfortunately, federal and state legislators regularly focus on suburban and urban education needs, ignoring the unique challenges of rural education.
(Lavalley, 2018; Stoddard & Toma, 2021; Walker, 2019). Policies and funding decisions are created based on what is best for urban areas, creating challenges and deficits rural school districts struggle to overcome (Bryant, Jr., 2010; Dayton, 2003; Eady & Zepeda, 2007; Lavalley, 2018; Walker, 2019).

Missouri’s rural student numbers mirror the national average in that 21% attend a rural public school (Shelton, 2019; Showalter et al., 2019). In their report on rural education utilizing United States Census Bureau figures, Showalter et al. (2019) stated that over 43% of Missouri school districts are rural, accounting for just under 200,000 students. Shelton (2019) published even larger figures, stating that 70% of Missouri school districts are rural. Either way, the amount of rural Missouri students and school districts affected by legislative policies and state funding decisions is worthy of further study.

**Rural School District Funding**

A significant challenge for rural school districts is funding inequities compared to larger districts. Rural school districts average higher per-pupil costs than larger districts yet receive less overall funding from all three revenue sources (AASA, 2017; Bigham et al., 2014; Dhaliwal & Bruno, 2021; Johnson et al., 2012; Rauscher, 2020). Rural districts are disadvantaged by trying to comply with government regulations and policies while dealing with infrastructures, attracting and retaining quality teachers, and have staff needs unique to each rural locale (Bigham, 2014; Bryant, Jr., 2010; Dhaliwal & Bruno, 2021; Rinehart, 2016; Stoddard & Toma, 2021).

Student enrollment figures and local property tax bases are two significant factors accounting for rural school district funding challenges. State formulas are heavily based
on average student daily attendance (Missouri DESE, 2020; Monsees, 2012; Riley, 2016; Shuls, 2017; Verstegen, 2018). In Missouri, the hold harmless provision provides a cushion from revenue cuts for rural schools suffering declining enrollment (Herrold, 2018; Monsees, 2012). However, not all states have this safeguard, and school districts face shrinking revenues caused by declining enrollment (Bigham et al., 2014; Rauscher, 2020; Robson et al., 2019). Nationwide, an average of only 17% of total state education funds are dispersed to rural school districts (AASA, 2017; Tieken & Montgomery, 2021).

Local economies and unequal distribution of community resources affect rural school districts as well. Property taxes account for over 62% of local revenues (Baker & Corcoran, 2012; Bowling et al., 2019). Districts that possess higher assessed valuations (AV) generate more money per pupil (Baker & Corcoran, 2012; Bowling et al., 2019; Glenn, 2009; Jackson et al., 2015; Verstegen & Jordan, 2009). However, rural districts generally have much lower AV and struggle to generate necessary local funding (Baker, 2017; Baker et al., 2020; Evans et al., 2020; Lavalley, 2018).

These facts hold true for rural Missouri school districts. Showalter et al. (2019) noted that only 24.2% of Missouri state funding is distributed to rural districts. Although these districts are larger per square mile than their suburban and urban counterparts, Missouri farmland is taxed at a lower rate (McShane, 2016). Commercial property is taxed at a 32% rate, residential property at a 19% rate, and agricultural land at only a 12% rate (McShane, 2016). Based on school spending figures that McShane (2016) acquired from DESE statistics, on average urban districts have around $130,000 in AV per student, while rural districts average $88,000 in AV per student. In addition, urban per-pupil spending in Missouri averages $10,271, while rural districts average $9,572
(McShane, 2016). In Missouri, where local funding is the predominant funding source, local revenues, or lack of, significantly affect rural Missouri school districts (McShane, 2016; Riley, 2016; Shuls, 2017).

**Rural Poverty**

Rural school districts are tasked with educating larger percentages of students who live in poverty (Bouck, 2004; Bradley et al., 2012; Bryant, Jr., 2010; Logan & Burdick-Will, 2017; Robson et al., 2019). Rural counties house approximately 63% of children living in poverty, compared to 37% in urban counties (Lavalley, 2018; Schaefer et al., 2016). The national average is just over 15% for rural school-aged children living in poverty (Showalter et al., 2019).

The issue of poverty affecting academic performance has been researched throughout the years. It is documented that high-poverty students and schools have traditionally scored lower on national assessments than their low-poverty counterparts (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018; Lavalley, 2018). However, recent gains in rural assessment results have seen students score higher than their urban peers (Lavalley, 2018). As noted by Williams and Noguera (2010), “poverty does not cause academic failure, but it is a factor that profoundly influences the character of schools and student performance” (p. 45). For rural school districts, limited resources, coupled with increased accountability requirements, have created challenges in achieving higher assessment scores for all students, specifically those with poverty status (Bradley et al., 2012; Brownell et al., 2018; Dhaliwal & Bruno, 2021; Eady & Zepada, 2007; Rauscher, 2020).

**Rural Missouri and Poverty**
Many of Missouri’s highest-poverty districts are in rural areas (Baker et al., 2020). Rural areas continually suffer from state funding systems that fail to consider the unique educational needs of rural students, families, and schools (Brenner, 2016; Bryant, Jr., 2010; Strange, 2011). One-size-fits-all approaches at the state and national levels, including education policies, have created additional challenges for rural school districts. According to statistics from the National Center for Education Statistics (NCES), approximately 7.5 million public school students were educated in rural school districts during the 2016–17 school year (Showalter et al., 2019).

In addition, certain large suburban districts have rural student populations. When factoring in rural schools that are part of nonrural districts, that number grows to over nine million students (Showalter et al., 2019; Strange, 2011) and equates to approximately 20% of U.S. students attending rural schools (Bigham et al., 2014; Brenner, 2016; Robson et al., 2019; Showalter et al., 2019). Furthermore, 60% of U.S. counties are mostly or completely rural (Robson et al., 2019), while approximately half of school districts are rural (Brenner, 2016). These numbers justify the importance, as well as the civic and legal obligation of government and education officials, of ensuring that funding sources and opportunities are equitable for all public school students in their state, including those in rural school districts.

**Student’s Eligibility for Free and Reduced Lunch Status**

Although much higher than the student poverty rate, free and reduced-price meal percentages are often utilized by educational researchers as a proxy for describing student poverty status (Domina et al., 2018; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015). This information often is the only data available to school
districts in determining students’ socioeconomic status (Domina et al., 2018).

Additionally, these percentages determine federal Title I funding distributions to districts, and as noted earlier, may influence weighted student counts in state school funding formulas (Domina et al., 2018). Furthermore, NCLB legislation requires states to disaggregate student assessment scores and improve student performance in a variety of categories, including for students who receive free and reduced-price meals (Darling-Hammond, 2007; Dee & Jacob, 2010; Klein, 2015). These data are often employed by researchers and pundits to examine and describe gaps in student achievement.

However, caution should be applied when using free and reduced-price lunch percentages as a proxy for student poverty status (Petrilli, 2017; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015). Not all families who qualify for the program return completed applications to school districts (The Rural School and Community Trust, 2015). In addition, families who earn too much income for free and reduced-price meals may still qualify under direct certification owing to receiving other public assistance (Petrilli, 2017). Finally, the community eligibility provision has raised free and reduced lunch numbers in school districts where 40% of students were identified through direct certification (Petrilli, 2017). In those districts, 100% of students are considered as qualified for the program and receive free meals, skewing district socioeconomic data (Petrilli, 2017; Snyder & Musu-Gillette, 2015; The Rural School and Community Trust, 2015).

Although no school data point perfectly represents student poverty levels, free and reduced-price meal percentages still provide the closest approximation for analyzing economically disadvantaged students and school data (Domina et al., 2018; Snyder &
The number of U.S. students qualifying for free and reduced lunch has increased significantly since the early 1980s. In 1982, the number qualifying was 32%, whereas in 2013, 51% of students were eligible (The Rural School and Community Trust, 2015; U.S. Department of Education, 2021). In addition, 14% of rural students attend a school where over 75% of the student population receives free and reduced-price lunches (Kominiak, 2018; Lavalley, 2018; Tieken & Montgomery, 2021).

Missouri’s numbers mirror these national numbers. In the 2018–19 school year, 50.1% of Missouri students were eligible for free and reduced lunches (Missouri DESeC, 2021; National Center for Education Statistics, 2015). In addition, the number of rural Missouri students receiving free and reduced lunches was above 50% (Robson et al., 2019; Shelton, 2019). Missouri’s eligibility percentage has risen significantly over the past 20 years from when only 35% of students qualified for free and reduced lunches during the 2000–01 school year (National Center for Education Statistics, 2015).

**Standardized Assessments in the United States**

Various educational reforms have created accountability measures for all 50 states and their public school districts. Beginning in 1982 with A Nation at Risk, the utilization of assessments for accountability purposes has become a staple of American education. Although states possess the overall power for measuring school districts, the federal government has played a large role in creating the blueprint for accountability and assessments.

**Missouri Assessment Program**

The MAP was created in response to the 1993 Outstanding Schools Act (Missouri DESE, 2021a). Originally this assessment measured student performance based on the
Missouri Show-Me Standards (Missouri DESE, 2021a). Grade- and course-level expectations were developed from these standards to provide a framework for teacher instruction (Missouri DESE, 2021a). Currently the MAP assessment determines student performance based on the MLS, an upgraded version of the Show-Me Standards (Missouri DESE, 2021a).

The first iteration of the MAP tested the following subjects and grade levels: communication arts in grades 3, 7, and 11; mathematics in grades 4, 8, and 10; and science in grades 3, 7, and 10 (Missouri DESE, 2021a). However, when NCLB legislation was constituted, testing began in communication arts and mathematics for grades 3–8 and once during the high school years (Missouri DESE, 2021a). In addition, science was tested once in grades 3–5, once in grades 6–9, and once in grades 10–12 (Missouri DESE, 2021a). During the 2008–09 school year, EOC assessments were instituted to replace high school MAP assessments (Missouri DESE, 2021a).

MAP and EOC results are collected, disaggregated, and reported based on federal and state requirements (Missouri DESE, 2021a). Students score in one of four categories: below basic, basic, proficient, and advanced (McShane, 2016; Missouri DESE, 2021a). The goal for Missouri schools is for 100% of students to score in the proficient and advanced categories. Overall category percentages are collected and combined with other scoring categories to determine the AYP of students as part of the MSIP (Missouri DESE, 2021a).

**Theoretical Framework**

As Baker (2018) described, in 1979, Berne and Stiefel created a framework of equity and fairness for state school finance systems, which predated current funding
systems and No Child Left Behind (NCLB). Their concept of equity noted that “the idea of equity involves value judgments about how to determine fairness in the financing of K-12 education” (National Research Council, 1999, p. 10). This conceptual framework was based on two main framing questions. The first question was equity of what, which Baker (2018) “suggested . . . could be framed in terms of financial inputs to schools, real resource inputs (such as teachers and their qualification), and outcomes” (p. 21). The focus of this question was money; how much a state could, or should, allocate to ensure educational opportunities and results were fair and available for all students.

The second question of the framework was focused on equity for who, which Baker (2018) noted “typically involved ‘students’ and ‘taxpayers’” (p. 21). In this framework, Berne and Stiefel specified that a “state school finance system should be based on fair treatment of taxpayers and yield fair treatment of students” (as cited in Baker, 2018, p. 21). Although students are often blissfully unaware of whether their treatment is equitable, taxpayers certainly are aware. Perhaps rightfully so, taxpayers are opinionated on who receives their tax dollars, the amount of those tax dollars, and how those dollars should be spent. Disparities in the amount of taxes collected between neighboring districts, and statewide, leads to bitter feelings among district taxpayers (Johnson & Vesely, 2017). States currently have various methods of funding public school districts, structuring foundation formulas to ensure both horizontal and vertical equity.

**Berne and Stiefel’s Horizontal Equity**

Horizontal equity focuses on the equal treatment of equals (Baker, 2018; Baker & Corcoran, 2012; Berne & Stiefel, 1994; Toutkoushian & Michael, 2008; Verstegen,
In state school finance systems, horizontal equity is present when every district receives the same amount per pupil because it is assumed all students are the same (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001; Toutkoushian & Michael, 2008; Verstegen, 2015). This equal allotment is designed to ensure all students meet the same standardized educational goals (Augenblick et al., 1997; Hinojosa, 2018). Often, these funds are distributed based on a specific number, such as student average daily attendance (Baker, 2018; Hinojosa, 2018).

Horizontal equity is considered a “fair” method of distributing wealth because basing funding on an equal number ensures states provide equal educational opportunity (Johnson & Vesely, 2017). Horizontal equity does not account for differing factors in public school districts, including property wealth, income levels, or location (Baker, 2018; Baker & Corcoran, 2012; Hinojosa, 2018; Mathis, 2001). In addition, horizontal equity does not guarantee equitable opportunities for all students (Baker, 2018) because some students have specific needs that are unequal to their peers. As Johnson and Vesely (2017) explained, “the pursuit of equitable treatment of students often results in the unequal distribution of resources” (p. 92). This acknowledgment of unequal resources for districts highlights the importance of vertical equity.

**Berne and Stiefel’s Vertical Equity**

The premise of vertical equity is that all students are not created the same. Similar to providing educational services to students, this pertains to state school finance systems as well. Vertical equity is the unequal treatment of unequals (Baker, 2018; Baker & Corcoran, 2012; Berne & Stiefel, 1994; Mathis, 2001) and is focused on the needs of individual students. Baker (2018) discussed vertical equity as “requiring differentiation of
programs and services, including additional supports” (p. 22). Students possess varying needs, necessitating states to provide different funding amounts to school districts (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001; Verstegen, 2015). This unequal funding is necessary to provide additional support, increasing opportunities for at-risk students’ success (Baker, 2018; Johnson & Vesely, 2017; Mathis, 2001).

Public school districts have varying needs and students who require more academic support and interventions (Baker, 2018; Toutkoushian & Michael, 2008). This requires districts to spend more to ensure all students reach academic goals (Mathis, 2001). To achieve vertical equity, state formulas utilize multipliers, or weighted counts, in their funding formula to create more aid for students with greater academic needs (Baker & Corcoran, 2012; Hinojosa, 2018; Johnson & Vesely, 2017; Mathis, 2001). These formula methodologies vary as regards determining students who qualify for weighted counts but often include free and reduced lunch percentages, special education populations, students for whom English is not a first language, and foster care or homeless students (Hinojosa, 2018; Johnson & Vesely, 2017). As Verstegen (2015) noted, “children in dissimilar circumstances can be treated differently but only for legitimate and justifiable reasons” (p. 3).

**Methodology**

**Data collection.** The researcher collected data from the DESE Missouri Comprehensive Data System District Report Card for the 2018-19 school year (Missouri DESE, 2021c). The researcher selected seventh graders who completed the Missouri Assessment Program (MAP) mathematics assessment as the dependent variable (Mertens, 2020). Utilizing seventh-grade scores allowed for homogeneity (Mertens, 2020) and
allowed K-8 public school district representation. Homogeneity ensured that data was constant and could be compared reliably (Field, 2018).

The MAP mathematics assessment is one of the grade and subject level tests mandated by the Missouri Department of Elementary and Secondary Education (DESE) to assess student learning and comply with NCLB regulations (Missouri DESE, 2021b). The MAP is administered by all Missouri public schools in grades 3-8, utilizing these assessments to measure student skills and knowledge based on the Missouri Learning Standards (Missouri DESE, 2021d). This data is uploaded to the Comprehensive Data System District Report Card annually, providing publicly available assessment data at state, district, and building levels (Missouri DESE, 2021c).

Information for Missouri rural school district classification was based on The U.S. Department of Education Small, Rural School Achievement List (SRSA) Master Eligibility List to determine all Missouri school districts classified as rural and receiving SRSA funding (U.S. Department of Education, n.d.). In addition, the Missouri Salary Schedule and Benefits Report was utilized to determine base teacher salaries for the 2018-19 school year (Missouri State Teachers Association, 2019).

From those three sources, information was collected for the independent and dependent variables and entered into a Microsoft Excel spreadsheet. Schools whose data for the Grade 7 MAP Mathematics assessment were not available on District Report Cards were then excluded from the study. Additional spreadsheet tabs were then created comparing the dependent and independent variables listed in Table C1.

Table 1

*Independent and Dependent Variables*
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Local Funding Percentage</td>
<td>1. Grade 7 MAP Mathematics Proficient and Advanced percentages</td>
</tr>
<tr>
<td>2. Assessed Valuation of local real estate and personal property</td>
<td></td>
</tr>
<tr>
<td>3. Student Free/Reduced Lunch Percentages</td>
<td></td>
</tr>
<tr>
<td>4. District Base Teacher Salary</td>
<td></td>
</tr>
<tr>
<td>5. Per-Pupil Allotment through Local Taxes</td>
<td></td>
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<tr>
<td>6. Districts who received/did not receive Small Schools Grant Funding</td>
<td></td>
</tr>
</tbody>
</table>

**Data analyses.** Microsoft Excel spreadsheet data was then imported into IBM SPSS Statistics for analysis. Descriptive statistics were calculated for each variable based on 214 Missouri school districts whose 2018-19 Grade 7 MAP Mathematics assessment data was available. For these variables, a mean and standard deviation were calculated.

Quartiles were utilized to easily divide the data into four groups, allowing for comparisons between groups (Field, 2018; Knoch, 2018). Quartile qualifications were determined for each of the following variables: local revenue percentage, assessed valuation, free and reduced lunch percentage, teacher base salary, and per pupil allotment through local taxes. This also allowed the researcher to describe the average of each quartile, as well as the spread of data in each quartile (Field, 2018; Knoch, 2018).

Quartiles for the study were determined by calculating the median and splitting the data into halves, then splitting those halves to determine four overall quartiles (Field, 2018). These quartiles are described as quartile 1, quartile 2, quartile 3, and quartile 4. When necessary due to an even amount of data in a quartile, the median number was dropped to create quartiles with the same number of school districts (Field, 2018).
For research questions 2-6, individual one-way ANOVA analyses were conducted to determine whether there were significant differences between quartiles for these variables: local revenue percentages, assessed valuation, free and reduced lunch percentages, teacher base salary, and per pupil allotment through local taxes. For question 7 concerning whether there was a significant difference between schools who did/did not receive DESE Small Schools Grant funding, an independent samples t-test was conducted. Conducting a t-test involves comparing the means of two groups determining whether there is a significant difference between them (Field, 2018). For question 8, which considered what factors predicted performance on the 2019 Grade 7 MAP Mathematics assessment, a multiple linear regression was conducted on the two questions that had demonstrated significant differences.

As suggested by Field (2018), a post-hoc Tukey’s Honestly Significant Different (HSD) analysis was performed on ANOVA results showing significant differences, helping make meaning of the data. The Tukey HSD is utilized to determine whether there are significant differences among sample means (Field, 2018; Salkind, 2010). Tukey’s HSD severely limits the possibility of committing a Type I error (Field, 2018; Salkind, 2010). Tukey HSD was implemented once initial significant differences were noted from ANOVA analysis in research questions concerning free and reduced lunch quartiles and per pupil allotment through local taxes.

**Findings**

**Free/Reduced Lunch Quartiles:** A research question was designed to determine whether district free and reduced lunch quartiles showed a significant difference in student success percentages.
RQ 4: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages?

Results from the one-way ANOVA considering free and reduced lunch quartiles were shown to be statistically significant for quartiles 1 and 4. Results did not reveal significant differences for the middle quartiles. There was a statistically significant difference (p = 0.006) when comparing quartile 1 (M = 43.1, SD = 16.2) and quartile 4 (M = 31.2, SD = 17.1). The null hypothesis was rejected for these differences due to the statistically significant differences. No statistical significance was found when compared to quartile 2 (M = 38.2, SD = 19.2) and quartile 3 (M = 34.7, SD = 14.0). The researcher failed to reject the null hypothesis for these differences.

Due to the ANOVA analysis finding statistically significant differences in student success percentages according to free and reduced lunch quartiles, a post-hoc Tukey HSD was performed. Tukey HSD found that the only significant difference was between school districts that were in the lowest quartile of free and reduced lunch percentages and school districts in the highest quartile. This indicated that school districts with the lowest levels of students eligible for free and reduced lunch performed significantly better than school districts with the highest levels of student free and reduced lunch eligible.

Table 2

ANOVA of 2018-19 Grade 7 Math Proficiency by Free/Reduced Lunch Quartiles

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>F(3, 209)</th>
<th>η²</th>
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<tbody>
<tr>
<td>M</td>
<td>SD</td>
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</table>
Per Pupil Allotment through Local Taxes Quartiles: Another research question was designed to determine whether per pupil allotment through local taxes quartiles showed a significant difference in student success percentages.

RQ 6: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per pupil allotment through local taxes?

Results from the one-way ANOVA per pupil allotment through local taxes quartiles were shown to be statistically significant for quartiles 1 and 4. Results did not reveal a statistically significant difference for the middle quartiles. There was a statistically significant difference ($p = 0.023$) when comparing quartile 1 ($M = 31.5$, $SD = 16.0$) and quartile 4 ($M = 40.7$, $SD = 18.7$). The null hypothesis was rejected for these differences due to the statistically significant differences. No statistical significance was found when compared to quartile 2 ($M = 39.7$, $SD = 18.2$) and quartile 3 ($M = 35.1$, $SD = 14.2$). The researcher failed to reject the null hypothesis for these differences.

The ANOVA analysis provided statistically significant differences in math proficiency between school districts in different quartiles of per pupil allotment per levy quartiles. A post-hoc Tukey HSD found the only significant difference in math proficiency was between districts that appeared in the lowest quartile of per pupil allotment by levy and districts in the highest quartile. This indicated that school districts with the lowest levels of per pupil allotment through local taxes performed significantly
lower than school districts with the highest levels of per pupil allotment through local
taxes.

**Table 3**

*ANOVA of 2018-19 Grade 7 Math Proficiency by Per Pupil Allotment Through Local Taxes*

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>F(3, 209)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Math Prof.</td>
<td>31.5</td>
<td>16.0</td>
<td>39.7</td>
<td>18.2</td>
<td>35.1</td>
<td>14.2</td>
</tr>
</tbody>
</table>

* p < .05. **p < .01

**Factors Predicting Performance on the Grade 7 MAP Math Assessment:**

Finally, a research question was designed to compare factors that proved statistically
significant in the previous research questions.

RQ 8: What factors predict performance on the 2019 Grade 7 MAP mathematics
assessment?

Since there were significant differences in Math proficiency by district based on
the district’s quartile rank of students eligible for free or reduced lunch and quartile of per
pupil allotment through local taxes, the researcher ran a regression analysis. For the
dependent variable, Grade 7 MAP Mathematics Proficient and Advanced percentages
were employed. For the independent variables, student eligible for free or reduced lunch
and per pupil allotment through local taxes were utilized.

First, collinearity diagnostics were performed on these two potential independent
variables. Of the three dimensions in the collinearity diagnostics, the condition indices
were 1.000, 3.400 and 8.534. Since all values were well below 15, we can assume there
would be no multicollinearity between these two independent variables used in the
regression model.
Linear regression indicated that there was a collective significant effect between the quartiles of free and reduced lunch, levies and math proficiency, \(F(2, 207) = 7.37, p < .001, R^2 = .07\). The individual predictors were examined further and indicated that free and reduced lunch was a significant predictor in the model \(t = -3.109, p = .002\) and per pupil allotment through local taxes was not \(t = .880, p = .380\).

Due to the results of the individual predictors, the model was run again using only quartiles of free and reduced lunch as the predictor. There was again a statistically significant effect of just this predictor on math proficiency \(F(1, 210) = 14.72, p < .001, R^2 = .07\). The individual predictor free and reduced lunch by quartile was still significant in the model \(t = -3.837, p < .001\).

**Discussion**

**Free/Reduced Lunch.** The analysis of ANOVA data, along with a post-hoc Tukey’s HSD, determined a statistically significant difference \(p = 0.006\) when comparing quartile 1 \(M = 43.1, SD = 16.2\) which contained school districts with the lowest student free/reduced lunch percentages, and quartile 4 \(M = 31.2, SD = 17.1\) which included the highest percentage of student free/reduced lunch percentages. However, no other statistically significant differences were found when comparing those quartiles in relation to quartiles 2 and 3.

As noted by Williams and Noguera (2010), “poverty does not cause academic failure, but it is a factor that profoundly influences the character of schools and student performance” (p. 45). For rural school districts, limited resources, coupled with increased accountability requirements, have created challenges in achieving higher assessment
scores for all students, specifically those with poverty status (Bradley et al., 2012; Brownell et al., 2018; Dhaliwal & Bruno, 2021; Eady & Zepada, 2007; Rauscher, 2020).

This finding when comparing those school districts with the lowest student free/reduced lunch percentages (Quartile 1) and highest student free/reduced lunch percentages (Quartile 4) mirrors what previous research has ascertained. This is particularly concerning when Missouri’s student free/reduced lunch eligibility percentage has risen significantly over the past 20 years, when only 35% of students qualified for free and reduced lunches during the 2000–01 school year (National Center for Education Statistics, 2015). During the 2018–19 school year, 50.1% of Missouri students were eligible for free and reduced lunches (Missouri DESE, 2021c). As these numbers increase, student performance on state assessments may see declining scores, causing rural Missouri districts with higher student concentrations of students who qualify for free/reduced lunch to perform poorly.

**Per Pupil Allotment through Local Taxes.** The analysis of ANOVA data, along with a post-hoc Tukey’s HSD, determined a statistically significant difference (p = 0.023) when comparing quartile 1 (M = 31.5, SD = 16.0) which included school districts with the lowest per pupil allotment through local taxes and quartile 4 (M = 40.7, SD = 18.7) which included the highest 25% of school districts with per pupil allotment through local taxes. However, no other statistically significant differences were found when comparing those quartiles in relation to quartiles 2 and 3.

In Missouri, where local funding is the predominant funding source, local revenues, or lack of, significantly affect rural Missouri school districts (McShane, 2016; Riley, 2016; Shuls, 2017). Districts that possess higher assessed valuations (AV) generate
more money per pupil (Baker & Corcoran, 2012; Bowling et al., 2019; Glenn, 2009; Jackson et al., 2015; Verstegen & Jordan, 2009). However, rural districts generally have much lower AV and struggle to generate necessary local funding (Baker, 2017; Baker et al., 2020; Evans et al., 2020; Lavalley, 2018).

The statistically significant differences noted between quartile 1 and quartile 4 support the notion that a district’s overall wealth, as based on their tax levy and assessed valuation, influences student performance on a standardized assessment. Recent research studies would support that higher school funding levels accompany higher assessment scores (Baker et al., 2020; Darling-Hammond, 2019; Farrie et al., 2019; Hinojosa, 2018; Jackson et al., 2015). Results of this study provide noteworthy findings that highlight the role a rural Missouri community’s poverty may play in student success. School leaders must consider the impact the combination their local tax levies and assessed valuation may play in overall student academic success.

**Conclusion**

This researcher is optimistic that information and data from this study could be beneficial in future research that focuses on the topics of school finance, rural public school education, or standardized assessments; whether those are studied individually, or in some combination. Continued studies that focus on student academic achievement, and factors that may support or hinder achievement, are worthy pursuits. In an ever-changing climate for educational reform, constant research will be necessary to ensure data informs important decision-making for a variety of educational leaders and policymakers.

**School Finance.** Results of this study did not find a statistically significant difference when comparing local funding percentages, but caution should be exercised
when concluding that funding does not affect student success on standardized assessments. With the results of per pupil allotment through local taxes showing that those with the highest amount and those with the lowest amount showing a statistically significant difference, this study provides the possibility that funding influences student academic success. While state school funding reforms have been focused on shrinking the gap between property-rich and property-poor districts, local funding and property taxes remain a significant component of school district revenues (Baker, 2018; Bowling et al., 2019; Raikes & Darling-Hammond, 2019; Verstegen, 2011).

Local funding dependence is especially true in Missouri, where during the 2019–20 school year, the amount of state aid decreased significantly from 2018–19 levels, accounting for only 40.74% of district revenues, while the local percentage increased to 48.19% (Missouri DESE, 2021c). In addition, a recent report from Missouri State Auditor Nicole Galloway noted that Missouri ranked 49th in the nation in state funding for school districts, emphasizing the burden school districts have in relying on local funding (Gerber, 2021). Local revenues also impact school districts in other states as well. During the 2014–15 school year, national averages for school district funding levels comprised of 9% federal funds, 46% state funds, and 45% local funds (Baker et al., 2018; Farrie et al., 2019; Hinojosa, 2018).

Based on study findings, the impact of local funding on student academic and assessment performance should continue to be a focus of future research informing financial decision-making at both the national and state levels. In Missouri alone, the reliance on local funding to keep school districts running has increased greatly in the past few years. This should be a concerning trend for not only school administrators, but for
legislators as well. More research and focus must be conducted to determine whether state school funding mechanisms, especially in Missouri, have outgrown their intended purpose and necessitate modifications.

**Rural Public School Education.** Results from the study give credence to previous research (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018; Lavalley, 2018) that when using student free/reduced lunch percentages as a proxy for poverty, students from higher poverty score lower on national assessments than students from lower poverty. This is especially concerning for rural school districts, who are tasked with educating larger percentages of students who live in poverty (Bouck, 2004; Bradley et al., 2012; Bryant, Jr., 2010; Logan & Burdick-Will, 2017; Robson et al., 2019). Rural counties house approximately 63% of children living in poverty, compared to 37% in urban counties (Lavalley, 2018; Schaefer et al., 2016).

In addition to these challenges for rural educators, school funding and education reforms are often not a focus of those in power. Unfortunately, federal and state legislators regularly focus on suburban and urban education needs, ignoring the unique challenges of rural education (Lavalley, 2018; Stoddard & Toma, 2021; Walker, 2019). Policies and funding decisions are created based on what is best for urban areas, creating challenges and deficits rural school districts struggle to overcome (Bryant, Jr., 2010; Dayton, 2003; Eady & Zepeda, 2007; Lavalley, 2018; Walker, 2019). To better inform policymakers and educational organizations alike, more research should be focused on rural education in general, and what factors impact student academic and assessment performance.
Study findings validate an especially concerning situation for rural schools with the increase of students now qualifying for free and reduced lunches. Current research into family and child poverty has no doubt provided many reasons as to why more families would be eligible for free and reduced lunches, yet policymakers must not only accept the data from this study but numerous other educational studies that prove the relationship between student free and reduced lunch percentages and student academic achievement. The issue is not within school districts; the challenge for policymakers is to determine what steps can be enacted to helps families break the poverty cycle that causes so many issues, including educational achievement, in rural locales.

**Standardized Assessments.** To meet the requirements of the Every Student Succeeds Act (ESSA), each state is tasked with assessing students in grades 3–8 in math and language arts, and providing an additional test for science was required in the elementary, middle school, and high school ages (Darling-Hammond et al., 2016; Egalite et al., 2017; Sharp, 2016). In addition, ESSA requires the collection of data based on student and subgroup results (Alexander & Jang, 2020; Egalite et al., 2017; Sharp, 2016). While ESSA allows states the ability to add additional accountability measures to determine overall district performance, instead of simply basing it on a high-stakes assessment (Adler-Greene, 2019; Darling-Hammond et al., 2016), assessment results are still how schools are portrayed through the media. The bottom line remains, the higher the assessment scores, the “better” a school district is when compared to its counterparts.

This study was not designed to consider the MAP assessment, or any standardized assessment, on its own merits. The data utilized was a snapshot of one grade level, one subject assessment, and one school year. It would behoove future researchers to consider
other factors, and the assessment itself, when conducting further research considering student performance and variables that may impact those results. More studies should be conducted to determine if similar findings and relationships exist at different grade levels, considering different subjects that are assessed, and across multiple states. In addition, information from this study or others may benefit future researchers in identifying variables worth utilizing in their studies or providing other considerations that could affect student academic and assessment performance.

About the Author

Ethan G. Sickels is Superintendent of the Rock Port R-II School District in Rock Port, Missouri. His research interests include public K-12 school funding, with an emphasis on rural school districts and their educational opportunities. ethan.sickels@rpbluejays.com
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SECTION SIX

SCHOLARLY PRACTITIONER REFLECTION

The past 3 years have provided a variety of opportunities to challenge my beliefs, strengthen my leadership skills, and become more reflective on what is truly important to me not only as an educator, but as a person as well. The culmination of the dissertation writing process provides an opportunity to review what has been a time-consuming, arduous, and enlightening journey for my development as an educational leader and scholar. The dissertation itself has required patience, persistence, and perseverance; these are qualities this researcher possessed in smaller quantities before this endeavor. Along the way, hours spent throughout the dissertation process have provided additional input and credence to my improvement as an educational leader and scholar.

My Practice as an Educational Leader

The first assignment that began our doctoral program was the StrengthsFinder survey. Two of the highest-ranking signature themes identified from my results have proven crucial to my success throughout the dissertation process, as well as for my roles as an educational leader and scholar. The identified theme that has affected my dissertation and my improvement as an educational leader is the theme of discipline.

Discipline is a signature theme requiring routine and structure for my learning, dividing my timeline for my dissertation and work tasks into checklists and short-term goals (Clifton et al, 2006). The overabundance of available research and data as one begins the dissertation process is overwhelming. I have analyzed and synthesized the articles and data sources filling two copy paper boxes in my office into a paper that conveys a coherent view of school finance, rural education, and the effects of specific
variables affecting student achievement on a standardized assessment. Without the discipline to structure my learning and finish the dissertation process, the trees sacrificed in my pursuit of this goal would be for naught.

Discipline was not only necessary in shaping my coursework and completion of the dissertation over the past 3 years but has also played a key component as a goal-directed school district leader. I understand the importance of establishing district priorities, structuring time to create and pursue district goals, and provide a structure conducive to accomplishing these goals (Bolman & Deal, 2010; Bolman & Gallos, 2011; Northouse, 2019) and strengthening my leadership skills. Although I have considered myself a goal-focused leader, the skills and knowledge gained throughout the dissertation process have improved my ability to successfully lead our district in a purposeful direction (Chatalalsingh & Reeves, 2014). This continued growth as a leader would not have been possible without the enhanced ability to comprehend and critically analyze the multitudes of data available to educational leaders and researchers.

As Clifton et al. (2006) stated, “you must forever be a learner, or you will be left behind” (p. 232). The dissertation research process has provided credence to that statement, given the amount of time spent reading articles has provided a wealth of knowledge that influenced not only my paper but also my understanding of the legislation and issues that have shaped the realms of school finance and rural education. Although my focus has been on challenges for Missouri education leaders, the opportunity to read and reflect on articles highlighting struggles for other states as they also contend with educational reforms and mandates that affect both their rural schools and school finance.
systems has broadened my knowledge base concerning the entire U.S. educational system.

This reflective inquiry has not only strengthened the quality of my dissertation but has been beneficial in improving my educational leadership practices as well. As Gill (2010) noted, leaders must encourage and support reflective learning for their district staff; this establishes districts as true learning organizations. Reflecting on and synthesizing both quantitative and qualitative data has been a key component of my reflective inquiry and research process. The skills garnered during this process have transferred to my job as an educational leader in that, through my improvement, I now understand how reflective inquiry (Gill, 2010) is a critical aspect of district evaluation.

The more my staff and I synthesize the quantitative and qualitative data available, the more we foster open communication and discussions focused on learning and overall results, which are the hallmarks of learning organizations (Bruffee, 1999; Gill, 2010; Merriam & Bierema, 2014; Preskill & Brookfield, 2009). This has provided the impetus for allotting more time during our professional development days to for teachers to share knowledge and experiences with their colleagues, strengthening educational decision-making (Gill, 2010). In addition, this overall focus on data for both my organization and myself will lead to more impactful, transformative learning in the future (Christie et al., 2015; Merriam & Bierema, 2014; Mezirow, 2009; Taylor, 2009).

Along with synthesizing data, strengthening my ability to utilize critical reflection has been beneficial both for the dissertation process and for my growth as an educational leader. Analyzing and reassessing prior beliefs concerning rural education and school finance after considering numerous articles and data sources has expanded my knowledge
base and undoubtedly enhanced my leadership skills (Gill, 2010; Mezirow, 2009; Taylor, 2009). As an effective leader, I must provide my staff the opportunity for critical reflection as well, strengthening organizational learning and providing time for team education (Gill, 2010). Through a restructuring of our building schedules and professional development days, our administrative team has focused on providing more collaboration time to enhance staff opportunities for sharing strategies, while building team learning and instructional capabilities (Bruffee, 1999; Cueva, 2010; Preskill & Brookfield, 2009). Along with emphasis on data and research articles to help craft my dissertation, supporting my staff to also utilize data in helping strengthen their teaching and provide students with social and emotional support has been a beneficial byproduct supporting critical reflection.

**My Abilities as a Scholar**

The StrengthsFinder results also confirmed analytical thinking and learning as a signature theme (Rath, 2007). Deploying reflective inquiry requires asking questions, analyzing data, and utilizing those findings for decision-making and answering research questions (Clifton et al., 2006; Gill, 2010). This analytical outlook has been especially beneficial as both a scholar and educational leader, allowing me to create independent problem-centered learning goals and employ data to make positive, and perhaps transformative, changes from my dissertation findings (Chen, 2014; Christie et al., 2015; Gill, 2010; Merriam & Bierema, 2014).

Throughout the dissertation process, data analysis has been a continuous task. Utilizing skills learned throughout the program, I have collected and analyzed dissertation data, ensuring that necessary questions were asked and that quality analysis
was implemented to answer research questions (Spickard, 2017; Zettelmeyer & Boling, 2014). Knowledge gathered through critical questioning and analysis improves not only my scholarly pursuits but my administrative practices as well, increasing my expertise (Dirkx, 2006; Schultz, 2010). These enhanced skills have improved my ability to comprehend and analyze scholarly writing, strengthened my leadership capabilities (Perry, 2016), and confirmed the necessity of data-based decision-making in both my academic and professional realms.

Data analytics have become interwoven with educational decision-making over the past 20 years. As noted earlier in my paper, the requirements of No Child Left Behind (NCLB) and Race to the Top (RTT) legislation have mandated school districts to collect, disaggregate, and analyze data ensuring student needs are met (Dodman et al., 2019; Lasley, 2009; Potter & Stefkovich, 2009; Skrla et al., 2004). These requirements have necessitated examining and implementing data-based decision-making (DBDM) processes more often than previously considered (Gummer, in press; Potter & Stefkovich, 2009; Skrla et al., 2004; Visscher, in press). To assist in DBDM, educational leaders have implemented a wide variety of quantitative and qualitative measurements to analyze student growth and learning.

My development as a scholar and researcher has also been influenced heavily by DBDM throughout this dissertation process. The amount of data available was overwhelming; my improved abilities at dissecting and understanding data have strengthened my data analysis skill set. As Zettlemeyer and Boling (2014) noted, a researcher must utilize their skills to ask relevant questions and determine whether a particular analysis is sound. This has been vital during the dissertation process in that my
capacity to understand and analyze data, as well as derive valid educational decisions from this analysis (Gummer, in press; Skrla et al., 2004), has influenced my final product.

My dissertation provides research and results that highlight the possible impacts of school funding on student achievement, potentially influencing policymakers’ decision-making. Any research focused on identifying possible factors affecting student learning gaps warrants the time and effort needed to analyze a multitude of studies prior to decision-making (Dodman et al., 2019, 2021; Skrla et al., 2004). The dissertation process has strengthened my belief that researchers must continually engage in varied and inquiry-focused data collection (Dodman et al., 2019, 2021; Lasley, 2009; Skrla et al., 2004) to produce research spurring positive changes in educational policy and reforms.

Communication is another area where personal improvement has occurred during dissertation completion, both in written form and in orally communicating my results with others. Throughout my work with my advisor and panel, I have focused on ensuring that data presented provide an accurate, honest representation of the results (Gill, 2010; Morris & Clark, 2012; Newcomer et al., 2015). Although personal biases are acknowledged (Johnson, 2018) by this researcher considering the topics of school funding and rural education, it is my ethical responsibility to disseminate the results without bias (Newcomer et al., 2015). Throughout this doctoral program, eliminating boundaries when communicating with peers (Gill, 2010) has been essential to achieving positive results throughout our multiple research opportunities. The dissertation journey has proven no different because communication with members of my panel and my advisor have allowed for enhanced learning opportunities and strengthened my abilities as a researcher and scholar (Ettling, 2012; Gill, 2010; Merriam & Bierema, 2014).
Although the hours dedicated to this program and dissertation have accumulated quickly, the growth achieved as both an educational leader and scholar have far outweighed the time spent. The opportunity to learn and reflect from various experiences (Bennis & Thomas, 2002/2011) has expanded and strengthened both my leadership and research capabilities. The opportunities to hear and learn from my peers and dissertation panel have influenced me as an adult learner (Chen, 2014; Christie et al., 2015; Gill, 2010; Merriam & Bierema, 2014) in ways not obtainable from only reading articles. Without cohort members sharing experiences, my growth and development in critical reflection and as a scholar would have been limited (Chen, 2014; Mezirow, 2009). Although the dissertation process has involved struggles, the growth achieved throughout the past 3 years has given this researcher the necessary skills to contribute a study that hopefully boosts future school funding and education reforms.
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# APPENDIX A

## Table A1

*Grade 7 Mathematics MAP Reporting Performance-Level Descriptors*

<table>
<thead>
<tr>
<th>Performance Levels</th>
<th>Performance Level Descriptors</th>
<th>MAP Scale Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Basic</td>
<td>Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for college and career readiness.</td>
<td>MAP Score Range: 270–393</td>
</tr>
<tr>
<td>Basic</td>
<td>Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for college and career readiness.</td>
<td>MAP Score Range: 394–434</td>
</tr>
<tr>
<td>Proficient</td>
<td>Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for college and career readiness.</td>
<td>MAP Score Range: 435–461</td>
</tr>
</tbody>
</table>
Advanced Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for college and career readiness.

Note: Data from Missouri Assessment Program Grade-Level Assessments: Guide to Interpreting Results, Missouri Department of Elementary and Secondary Education, November 2018.
APPENDIX B

IRB Approval

MU eCompliance

IRB Determination Notice Project #2076202 Review #347791

Project #2076202
Project Title: Local Funding Percentages as a Predictor of Middle School Student Success on the Missouri Assessment Performance in Mathematics
Principal Investigator: Ethan Sickels (MU-Student)
Primary Contact: Ethan Sickels (MU-Student)

Dear Investigator,

The MU Institutional Review Board reviewed your application and supportive documents. It has been determined that this project does not constitute human subjects research according to the Department of Health and Human Services regulatory definitions. As such, there are no further IRB requirements.

If you have questions, please feel free to contact the MU IRB office at 573-882-3181 or email at muresearchirb@missouri.edu.

Sincerely,

MU Institutional Review Board
APPENDIX C

In this section the researcher discusses the methods, findings, discussion, and recommendations from the study. He collects descriptive statistics and conducts one-way ANOVA and multiple regression tests to answer various research questions. He utilizes IBM SPSS Statistics 23 and Microsoft Excel Spreadsheets to input and analyze data and findings.

Methods

Data Collection

The researcher collected data from the Missouri Department of Elementary and Secondary Education (DESE) Missouri Comprehensive Data System District Report Card for the 2018–19 school year (Missouri DESE, 2021f). The researcher selected seventh graders who completed the Missouri Assessment Program (MAP) mathematics assessment as the dependent variable (Mertens, 2020). Utilizing seventh-grade scores allowed for homogeneity (Mertens, 2020) and allowed K-8 public school district representation. Homogeneity ensured that data were constant and could be compared reliably (Field, 2018).

The MAP mathematics assessment is one of the grade- and subject-level tests mandated by the Missouri DESE to assess student learning and comply with NCLB regulations (Missouri DESE, 2021e). The MAP is administered by all Missouri public schools in grades 3–8, utilizing these assessments to measure student skills and knowledge based on the Missouri Learning Standards (MLS; Missouri DESE, 2021g). These data are uploaded to the Comprehensive Data System District Report Card.
annually, providing publicly available assessment data at state, district, and building levels (Missouri DESE, 2021f).

Information for Missouri rural school district classification was based on the U.S. Department of Education Small, Rural School Achievement List (SRSA) Master Eligibility List to determine all Missouri school districts classified as rural and receiving SRSA funding (U.S. Department of Education, n.d.b). In addition, the researcher used the Missouri Salary Schedule and Benefits Report to determine base teacher salaries for the 2018–19 school year (Missouri State Teachers Association, 2019).

From those three sources, the researcher collected information for the independent and dependent variables and entered it into a Microsoft Excel spreadsheet. Schools whose data for the Grade 7 MAP mathematics assessment were not available on District Report Cards were then excluded from the study. The researcher then created additional spreadsheet tabs comparing the dependent and independent variables listed in Table C1.
Table C1

*Independent and Dependent Variables*

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Local funding percentage</td>
<td>1. Grade 7 MAP mathematics proficient and advanced percentages</td>
</tr>
<tr>
<td>2. Assessed valuation of local real estate and personal property</td>
<td></td>
</tr>
<tr>
<td>3. Student free/reduced lunch percentages</td>
<td></td>
</tr>
<tr>
<td>4. District base teacher salary</td>
<td></td>
</tr>
<tr>
<td>5. Per-pupil allotment through local taxes</td>
<td></td>
</tr>
<tr>
<td>6. Districts that received/did not receive small schools grant funding</td>
<td></td>
</tr>
</tbody>
</table>

**Data Analyses**

The researcher then imported Microsoft Excel spreadsheet data into IBM SPSS Statistics for analysis. He calculated descriptive statistics for each variable based on 214 Missouri school districts whose 2018–19 Grade 7 MAP mathematics assessment data were available. For these variables, a mean and standard deviation were calculated.

The researcher utilized quartiles to easily divide the data into four groups, allowing for comparisons among groups (Field, 2018; Knoch, 2018). Quartile qualifications were determined for each of the following variables: local revenue percentage, assessed valuation, free and reduced lunch percentage, teacher base salary, and per-pupil allotment through local taxes. This also allowed the researcher to describe the average of each quartile, as well as the spread of data in each quartile (Field, 2018; Knoch, 2018). He determined quartiles for the study by calculating the median and
splitting the data into halves, then splitting those halves to determine four overall quartiles (Field, 2018). These quartiles are described as quartile 1, quartile 2, quartile 3, and quartile 4. When necessary based on an even amount of data in a quartile, the median number was dropped to create quartiles with the same number of school districts (Field, 2018).

For research questions 2–6, the researcher conducted individual one-way ANOVA analyses to determine whether there were significant differences among quartiles for these variables: local revenue percentages, assessed valuation, free and reduced lunch percentages, teacher base salary, and per-pupil allotment through local taxes. For question 7 concerning whether there was a significant difference between schools that did/did not receive DESE Small Schools Grant funding, the researcher conducted an independent samples t-test. Conducting a t-test involves comparing the means of two groups to determine whether there is a significant difference between them (Field, 2018). For question 8, which considered what factors predicted performance on the 2019 Grade 7 MAP mathematics assessment, the researcher conducted a multiple linear regression on the two questions that had demonstrated significant differences.

As suggested by Field (2018), the researcher performed a post hoc Tukey’s honestly significant different (HSD) analysis on ANOVA results showing significant differences, helping make meaning of the data. The Tukey HSD is utilized to determine whether there are significant differences among sample means (Field, 2018; Salkind, 2010). Tukey’s HSD severely limits the possibility of committing a Type I error (Field, 2018; Salkind, 2010). Tukey HSD was implemented once initial significant differences
were noted from ANOVA analysis in research questions concerning free and reduced lunch quartiles and per-pupil allotment through local taxes.

**Findings**

In this section the researcher identifies the findings for each research question. Data analyses are provided in both narrative and table/graph format. This section also outlines whether the null hypothesis was accepted or rejected based on statistical significance.

**Descriptive Statistics**

The researcher began by analyzing the first research question.

RQ1: What are the descriptive statistics for rural Missouri school districts during the 2018–19 school year considering Grade 7 MAP mathematics assessment results, local funding support, local assessed valuation, student free/reduced lunch eligibility, professional staff with advanced degree attainment, professional staff years of experience, and county poverty levels where the district resides?

As shown in Table C1, the sample size for this study was 214 school districts. The mean K-12 enrollment for these districts was 304 students. The mean of Grade 7 students scoring proficient or advanced on the MAP mathematics assessment was 36.9%. The mean for local revenue percentage was 47.5%. The mean assessed valuation for the 214 school districts was $30,627,894. The mean percentage of students who received free/reduced lunch was 56.9%. The mean of teacher base salaries was $30,758. The per-pupil allotment through local taxes was $4,206.84. The tax levy mean for the 214 districts in the study was $4.08.
Table C2

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-12 Enrollment</td>
<td>214</td>
<td>304</td>
<td>148</td>
</tr>
<tr>
<td>Grade 7 Math Prof &amp; Adv %</td>
<td>214</td>
<td>36.9%</td>
<td>17.1%</td>
</tr>
<tr>
<td>Local Revenue %</td>
<td>214</td>
<td>47.5%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Assessed Valuation</td>
<td>214</td>
<td>$30,627,894</td>
<td>$23,795,317</td>
</tr>
<tr>
<td>Free/Red Lunch %</td>
<td>214</td>
<td>56.9%</td>
<td>18.8%</td>
</tr>
<tr>
<td>Base Salary</td>
<td>214</td>
<td>$30,758</td>
<td>$2,287</td>
</tr>
<tr>
<td>Per-Pupil Allotment per Tax Levy</td>
<td>214</td>
<td>$4,206.84</td>
<td>$2,364.15</td>
</tr>
<tr>
<td>Tax Levy</td>
<td>214</td>
<td>$4.08</td>
<td>$0.74</td>
</tr>
</tbody>
</table>

Quartile Qualifications

The researcher determined quartile qualifications for a distribution of data to answer research questions 2–7. Table C2 provides the quartile qualifications that were utilized.

Table C3

Quartile Qualifications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Revenue %</td>
<td>39.5%</td>
<td>46.4%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Assessed Valuation</td>
<td>$15,932,549</td>
<td>$24,914,998</td>
<td>$37,403,876</td>
</tr>
<tr>
<td>Free/Red Lunch %</td>
<td>44.4%</td>
<td>55.2%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Base Salary</td>
<td>$29,250</td>
<td>$30,757.73</td>
<td>$32,000</td>
</tr>
<tr>
<td>Per-Pupil Allotment per Tax Levy</td>
<td>$2,759.51</td>
<td>$3,681.31</td>
<td>$4,951.07</td>
</tr>
</tbody>
</table>

Local Revenue Percentage Quartiles

The researcher designed the second research question to determine whether local revenue percentage quartiles showed a significant difference in student success percentages.
RQ 2: Is there a difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural districts and levels of local funding support?

The researcher performed a one-way ANOVA to determine if there were differences in Grade 7 MAP mathematics student success percentages based on quartiles considering local revenue percentage quartiles. Results from the one-way ANOVA showed no statistically significant results ($p = 0.465$) when comparing quartile 1 ($M = 33.8, SD = 17.1$), quartile 2 ($M = 37.3, SD = 17.6$), quartile 3 ($M = 39.4, SD = 18.2$), and quartile 4 ($M = 37.3, SD = 15.5$). The researcher accepted the null hypothesis for these differences.

**Table C4**

*ANOVA of 2018–19 Grade 7 Math Proficiency by Local Revenue Percentage Quartiles*

<table>
<thead>
<tr>
<th>Math Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>$F(3, 209)$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Math Prof.</td>
<td>33.8</td>
<td>17.1</td>
<td>37.3</td>
<td>17.6</td>
<td>39.4</td>
<td>18.2</td>
</tr>
</tbody>
</table>

* $p < .05$. ** $p < .01$
Assessed Valuation Quartiles

The third research question was designed to determine whether assessed valuation quartiles showed a significant difference in student success percentages.

RQ 3: Is there a difference in quartiles in rural Missouri public school student success percentages on the 2019 Grade 7 Missouri Assessment Program (MAP) mathematics assessment when considering rural Missouri school districts and assessed valuation?

The researcher conducted a one-way ANOVA to determine if there were differences in Grade 7 MAP mathematics student success percentages based on quartiles considering assessed valuation quartiles. Results from the one-way ANOVA showed no statistically significant results ($p = 0.951$) when comparing quartile 1 ($M = 36.5, SD = 20.1$), quartile 2 ($M = 37.6, SD = 18.6$), quartile 3 ($M = 35.9, SD = 17.2$), and quartile 4 ($M = 37.3, SD = 12.2$). The researcher accepted the null hypothesis for these differences.
Table C5

ANOVA of 2018–19 Grade 7 Math Proficiency by Assessed Valuation Quartiles

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>F(3, 208)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Prof.</td>
<td>36.5</td>
<td>20.1</td>
<td>37.6</td>
<td>18.6</td>
<td>35.9</td>
<td>17.2</td>
</tr>
</tbody>
</table>

* p < .05. **p < .01

Figure C2

Percentage of 2018–19 Grade 7 Students Scoring Proficient or Advanced in Math MAP by Quartile of Assessed Valuation

Free/Reduced Lunch Quartiles

The fourth research question was designed to determine whether district free and reduced lunch quartiles showed a significant difference in student success percentages.
RQ 4: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages?

Results from the one-way ANOVA considering free and reduced lunch quartiles were shown to be statistically significant for quartiles 1 and 4. Results did not reveal significant differences for the middle quartiles. There was a statistically significant difference (p = 0.006) when comparing quartile 1 (M = 43.1, SD = 16.2) and quartile 4 (M = 31.2, SD = 17.1). The null hypothesis was rejected for these differences owing to the statistically significant differences. No statistical significance was found when compared to quartile 2 (M = 38.2, SD = 19.2) and quartile 3 (M = 34.7, SD = 14.0). The researcher failed to reject the null hypothesis for these differences.

Based on the ANOVA analysis finding statistically significant differences in student success percentages according to free and reduced lunch quartiles, the researcher performed a post hoc Tukey HSD. The Tukey HSD showed that the only significant difference was between school districts that were in the lowest quartile of free and reduced lunch percentages and school districts in the highest quartile. This indicated that school districts with the lowest levels of students eligible for free and reduced lunch performed significantly better than school districts with the highest levels of students eligible for free and reduced lunch.
Table C6

ANOVA of 2018–19 Grade 7 Math Proficiency by Free/Reduced Lunch Quartiles

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>F(3, 209)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Prof.</td>
<td>43.1</td>
<td>38.2</td>
<td>34.7</td>
<td>31.2</td>
<td>3.750**</td>
<td>0.07</td>
</tr>
<tr>
<td>SD</td>
<td>16.2</td>
<td>19.2</td>
<td>14.0</td>
<td>31.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05. **p < .01

Figure C3

Percentage of 2018–19 Grade 7 Students Scoring Proficient or Advanced in Math MAP by Quartile of Free/Reduced Lunch Percentage

Teacher Base Salary Quartiles

The fifth research question was designed to determine whether teacher base salary quartiles showed a significant difference in student success percentages.
RQ 5: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and district base teacher salary?

The researcher performed a one-way ANOVA to determine if there were differences in Grade 7 MAP mathematics student success percentages based on quartiles considering teacher base salary quartiles. Results from the one-way ANOVA showed no statistically significant results ($p = 0.723$) when comparing quartile 1 (M = 36.9, SD = 19.3), quartile 2 (M = 37.2, SD = 15.1), quartile 3 (M = 37.8, SD = 18.3), and quartile 4 (M = 34.7, SD = 15.9). The researcher accepted the null hypothesis for these differences.

**Table C7**

*ANOVA of 2018–19 Grade 7 Math Proficiency by Teacher Base Salary Quartiles*

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>$F(3, 209)$</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Prof.</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Math Prof.</td>
<td>36.9</td>
<td>19.3</td>
<td>37.7</td>
<td>15.1</td>
<td>37.8</td>
<td>18.3</td>
</tr>
</tbody>
</table>

* $p < .05$. **$p < .01$
**Figure C4**

*Percentage of 2018–19 Grade 7 Students Scoring Proficient or Advanced in Math MAP by Quartile of Base Salary*

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Percent Math Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartile 1</td>
<td>36.9%</td>
</tr>
<tr>
<td>Quartile 2</td>
<td>37.7%</td>
</tr>
<tr>
<td>Quartile 3</td>
<td>37.8%</td>
</tr>
<tr>
<td>Quartile 4</td>
<td>34.7%</td>
</tr>
</tbody>
</table>

**Per-Pupil Allotment Through Local Taxes Quartiles**

The sixth research question was designed to determine whether per-pupil allotment through local taxes quartiles showed a significant difference in student success percentages.

RQ 6: Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per-pupil allotment through local taxes?

Results from the one-way ANOVA per-pupil allotment through local taxes quartiles were shown to be statistically significant for quartiles 1 and 4. Results did not reveal a
statistically significant difference for the middle quartiles. There was a statistically significant difference (p = 0.023) when comparing quartile 1 (M = 31.5, SD = 16.0) and quartile 4 (M = 40.7, SD = 18.7). The researcher rejected the null hypothesis for these differences owing to the statistically significant differences. No statistical significance was found when compared to quartile 2 (M = 39.7, SD = 18.2) and quartile 3 (M = 35.1, SD = 14.2). The researcher failed to reject the null hypothesis for these differences.

The ANOVA analysis provided statistically significant differences in math proficiency between school districts in different quartiles of per-pupil allotment per levy quartiles. A post hoc Tukey HSD showed the only significant difference in math proficiency was between districts that appeared in the lowest quartile of per-pupil allotment by levy and districts in the highest quartile. This indicated that school districts with the lowest levels of per-pupil allotment through local taxes performed significantly lower than school districts with the highest levels of per-pupil allotment through local taxes.

**Table C8**

ANOVA of 2018–19 Grade 7 Math Proficiency by Per-Pupil Allotment Through Local Taxes

<table>
<thead>
<tr>
<th>Percent Prof.</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>F(3, 209)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math Prof.</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>31.5</td>
<td>16.0</td>
<td>39.7</td>
<td>18.2</td>
<td>35.1</td>
<td>14.2</td>
<td>40.7</td>
</tr>
</tbody>
</table>

* p < .05. **p < .01
**Figure C5**

*Percentage of 2018–19 Grade 7 Students Scoring Proficient or Advanced in Math MAP by Quartile of Per-Pupil Allotment Through Local Taxes*

Districts Receiving DESE Small Schools Grant Funding

The seventh research question was designed to determine whether school districts that did receive DESE Small Schools Grant funding had a significant difference in student success percentages compared to school districts that did not receive DESE Small Schools Grant funding.

RQ 7: Is there a difference between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and districts that receive/did not receive DESE Small Schools Grant funding?
The researcher conducted an independent samples t-test to compare school districts that did or did not receive DESE Small Schools Grant funding and their student success percentages. The results indicated no statistically significant difference in student success percentages between schools that were ineligible for grant funding (M = 36.2, SD = 11.6) and those eligible for funding (M = 37.2, SD = 19.4), t(212) = .414, p = .68.

Table C9

_t-Test of 2018–19 Grade 7 Math Proficiency by Grant Eligibility_

<table>
<thead>
<tr>
<th>Percent Proficiency</th>
<th>Ineligible</th>
<th>Eligible</th>
<th>t(212)</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Math Prof.</td>
<td>36.2</td>
<td>11.6</td>
<td>37.2</td>
<td>19.4</td>
<td>.414</td>
</tr>
</tbody>
</table>

Figure C6

*Percentage of 2018–19 Grade 7 Students Scoring Proficient or Advanced in Math MAP by DESE Small Schools Grant Eligibility Status*
Factors Predicting Performance on the Grade 7 MAP Math Assessment

The final research question was designed to compare factors that proved statistically significant in the previous research questions.

RQ 8: What factors predict performance on the 2019 Grade 7 MAP mathematics assessment?

Because there were significant differences in math proficiency by district based on the district’s quartile rank of students eligible for free or reduced lunch and quartile of per-pupil allotment through local taxes, the researcher ran a regression analysis. For the dependent variable, the researcher employed Grade 7 MAP mathematics proficient and advanced percentages. For the independent variables, students eligible for free or reduced lunch and per-pupil allotment through local taxes were utilized.

First, the researcher performed collinearity diagnostics on these two potential independent variables. Of the three dimensions in the collinearity diagnostics, the condition indices were 1.000, 3.400, and 8.534. Because all values were well below 15, we can assume there would be no multicollinearity between these two independent variables used in the regression model.

Linear regression indicated that there was a collective significant effect among the quartiles of free and reduced lunch, levies, and math proficiency, \( F(2, 207) = 7.37, p < .001, R^2 = .07 \). The individual predictors were examined further and indicated that free and reduced lunch was a significant predictor in the model \( t = -3.109, p = .002 \) and per-pupil allotment through local taxes was not \( t = .880, p = .380 \).

Based on the results of the individual predictors, the researcher ran the model again using only quartiles of free and reduced lunch as the predictor. There was again a
statistically significant effect of just this predictor on math proficiency (F(1, 210) = 14.72, p < .001, R² = .07). The individual predictor free and reduced lunch by quartile was still significant in the model (t = -3.837, p < .001).

Discussion

For the research questions considering local funding percentages, assessed valuation, and district base teacher salary, the researcher determined no statistically significant differences when running one-way ANOVA analyses, leading him to accept the null hypothesis for these differences. In addition, the independent samples t-test employed to determine whether there was a statistically significant difference between schools that did receive the DESE Small Schools Grant, and those that did not, also failed to show a significant result. However, through one-way ANOVA analysis, two research questions were identified with quartiles that showed statistically significant differences when analyzed.

Research Question 4

Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and rural Missouri public school district student free/reduced lunch eligibility percentages? The analysis of ANOVA data, along with a post hoc Tukey’s HSD, determined a statistically significant difference (p = 0.006) when comparing quartile 1 (M = 43.1, SD = 16.2), which contained school districts with the lowest student free/reduced lunch percentages, and quartile 4 (M = 31.2, SD = 17.1), which included the highest percentage of student free/reduced lunch percentages. However, the researcher found no other statistically significant differences when comparing those quartiles in relation to quartiles 2 and 3.
Although no school data point perfectly represents student poverty levels, free and reduced-price meal percentages still provide the closest approximation for analyzing economically disadvantaged students and school data (Domina et al., 2018; Snyder & Musu-Gillette, 2015). The issue of poverty affecting academic performance has been researched throughout the years. It is well documented that high-poverty students and schools have traditionally scored lower on national assessments than their low-poverty counterparts (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018; Lavalley, 2018).

As noted by Williams and Noguera (2010), “poverty does not cause academic failure, but it is a factor that profoundly influences the character of schools and student performance” (p. 45). For rural school districts, limited resources, coupled with increased accountability requirements, have created challenges in achieving higher assessment scores for all students, specifically those with poverty status (Bradley et al., 2012; Brownell et al., 2018; Dhaliwal & Bruno, 2021; Eady & Zepada, 2007; Rauscher, 2020).

This finding when comparing those school districts with the lowest student free/reduced lunch percentages (Quartile 1) and highest student free/reduced lunch percentages (Quartile 4) mirrors what previous research has ascertained. This is particularly concerning when Missouri’s student free/reduced lunch eligibility percentage has risen significantly over the past 20 years, when only 35% of students qualified for free and reduced lunches during the 2000–01 school year (NCES, 2021). During the 2018–19 school year, 50.1% of Missouri students were eligible for free and reduced lunches (Missouri DESE, 2021f; NCES, 2021). As these numbers increase, student performance on state assessments may see declining scores, causing rural Missouri
districts with higher student concentrations of students who qualify for free/reduced lunch to perform poorly.

Research Question 6

Is there a difference in quartiles between rural Missouri public school student success percentages on the 2019 Grade 7 MAP mathematics assessment and maximum per-pupil allotment through local taxes? The analysis of ANOVA data, along with a post hoc Tukey’s HSD, determined a statistically significant difference (p = 0.023) when comparing quartile 1 (M = 31.5, SD = 16.0), which included school districts with the lowest per-pupil allotment through local taxes and quartile 4 (M = 40.7, SD = 18.7), which included the highest 25% of school districts with per-pupil allotment through local taxes. However, no other statistically significant differences were found when comparing those quartiles in relation to quartiles 2 and 3.

A school district’s ability to raise revenues is heavily dependent on local property tax wealth (Baker & Corcoran, 2012; Barnett & Kasmin, 2016; Hinojosa, 2018). As noted by Barnett and Kasmin (2016), approximately 80% of local school district revenue is collected from property taxes. Those districts with higher tax bases generate more revenue than those in higher-poverty districts can acquire (Morgan & Amerikaner, 2018; Raikes & Darling-Hammond, 2019). Although states’ funding formulas currently provide more vertical equity than before, local revenues continue to perpetuate funding gaps that high-poverty school districts struggle to overcome (Baker, 2018; Morgan & Amerikaner, 2018; Raikes & Darling-Hammond, 2019; Verstegen, 2014).

In Missouri, where local funding is the predominant funding source, local revenues, or lack of, significantly affect rural Missouri school districts (McShane, 2016;
Riley, 2016; Shuls, 2017). Districts that possess higher assessed valuations (AV) generate more money per pupil (Baker & Corcoran, 2012; Bowling et al., 2019; Glenn, 2009; Jackson et al., 2015; Verstegen & Jordan, 2009). However, rural districts generally have much lower AV and struggle to generate necessary local funding (Baker, 2017; Baker et al., 2020; Evans et al., 2020; Lavallee, 2018).

The statistically significant differences noted between quartile 1 and quartile 4 support the notion that a district’s overall wealth, as based on its tax levy and AV, influences student performance on a standardized assessment. Recent research studies would support that higher school funding levels accompany higher assessment scores (Baker et al., 2020; Darling-Hammond, 2019; Farrie et al., 2019; Hinojosa, 2018; Jackson et al., 2015). Results of this study provide noteworthy findings that highlight the role a rural Missouri community’s poverty may play in student success. School leaders must consider the impact that the combination of their local tax levies and AV may play in overall student academic success.

**Conclusion**

This researcher is optimistic that information and data from this study could be beneficial in future research focused on the topics of school finance, rural public school education, or standardized assessments, whether those are studied individually or in some combination. Continued studies focused on student academic achievement, and factors that may support or hinder it, are worthy pursuits. In an ever-changing climate for educational reform, constant research will be necessary to ensure data inform important decision-making for a variety of educational leaders and policymakers.
School Finance

Results of this study did not show a statistically significant difference when comparing local funding percentages, but caution should be exercised when concluding that funding does not affect student success on standardized assessments. With the results of per-pupil allotment through local taxes showing that those with the highest amount and those with the lowest amount show a statistically significant difference, this study raises the possibility that funding influences student academic success. Although state school funding reforms have been focused on shrinking the gap between property-rich and property-poor districts, local funding and property taxes remain a significant component of school district revenues (Baker, 2018; Bowling et al., 2019; Raikes & Darling-Hammond, 2019; Verstegen, 2011).

Local funding dependence is especially true in Missouri, where during the 2019–20 school year, the amount of state aid decreased significantly from 2018–19 levels, accounting for only 40.74% of district revenues, while the local percentage increased to 48.19% (Missouri DESE, 2021f). In addition, a recent report from Missouri State Auditor Nicole Galloway noted that Missouri ranked 49th in the nation in state funding for school districts, emphasizing the burden school districts have in relying on local funding (Gerber, 2021). Local revenues also affect school districts in other states as well. During the 2014–15 school year, national averages for school district funding levels comprised 9% federal funds, 46% state funds, and 45% local funds (Baker et al., 2018; Farrie et al., 2019; Hinojosa, 2018).

The impact of local funding on student academic and assessment performance should continue to be a focus of future research informing financial decision-making at
both the national and state levels. In Missouri alone, the reliance on local funding to keep school districts running has increased greatly in the past few years. This should be a concerning trend for not only school administrators, but for legislators as well. More research and focus must be conducted to determine whether state school funding mechanisms, especially in Missouri, have outgrown their intended purpose and necessitate modifications.

**Rural Public School Education**

Results from the study give credence to previous research (Bryant, Jr., 2010; Fishman, 2015; Jones et al., 2018; Lavalle, 2018) that when using student free/reduced lunch percentages as a proxy for poverty, students from higher poverty score lower on national assessments than students from lower poverty. This is especially concerning for rural school districts, which are tasked with educating larger percentages of students who live in poverty (Bouck, 2004; Bradley et al., 2012; Bryant, Jr., 2010; Logan & Burdick-Will, 2017; Robson et al., 2019). Rural counties house approximately 63% of children living in poverty, compared to 37% in urban counties (Lavalle, 2018; Schaefer et al., 2016).

In addition to these challenges for rural educators, school funding and education reforms are often not a focus of those in power. Unfortunately, federal and state legislators regularly focus on suburban and urban education needs, ignoring the unique challenges of rural education (Lavalle, 2018; Stoddard & Toma, 2021; Walker, 2019). Policies and funding decisions are created based on what is best for urban areas, creating challenges and deficits rural school districts struggle to overcome (Bryant, Jr., 2010; Dayton, 2003; Eady & Zepeda, 2007; Lavalle, 2018; Walker, 2019). To better inform
policymakers and educational organizations alike, more research should be focused on rural education in general and what factors affect student academic and assessment performance.

Especially concerning for rural schools is the increase in students who now qualify for free and reduced lunches. Current research into family and child poverty has no doubt provided many reasons as to why more families would be eligible for free and reduced lunches, yet policymakers must not only accept the data from this study but numerous other educational studies that prove the relationship between student free and reduced lunch percentages and student academic achievement. The issue is not within school districts; the challenge for policymakers is to determine what steps can be enacted to help families break the poverty cycle that causes so many issues, including educational achievement, in rural locales.

**Standardized Assessments**

To meet the requirements of the Every Student Succeeds Act (ESSA), each state is tasked with assessing students in grades 3–8 in math and language arts, and providing an additional test for science is required in the elementary, middle school, and high school ages (Darling-Hammond et al., 2016; Egalite et al., 2017; Sharp, 2016). In addition, ESSA requires the collection of data based on student and subgroup results (Alexander & Jang, 2020; Egalite et al., 2017; Sharp, 2016). Although ESSA allows states the ability to add additional accountability measures to determine overall district performance, instead of simply basing it on a high-stakes assessment (Adler-Greene, 2019; Darling-Hammond et al., 2016), assessment results are still how schools are
portrayed through the media. The bottom line remains, the higher the assessment scores, the “better” a school district is when compared to its counterparts.

This study was not designed to consider the MAP assessment, or any standardized assessment, on its own merits. The data utilized were a snapshot of one grade level, one subject assessment, and one school year. It would behoove future researchers to consider other factors, and the assessment itself, when conducting further research considering student performance and variables that may affect those results. More studies should be conducted to determine if similar findings and relationships exist at different grade levels, considering different subjects that are assessed, and across multiple states. In addition, information from this study or others may benefit future researchers in identifying variables worth utilizing in their studies or providing other considerations that could affect student academic and assessment performance.
VITA

Ethan (E. G.) Sickels grew up in Kellerton, Iowa, and was fortunate to attend both Grand Valley School District from kindergarten through sophomore year; and then upon closing, to finish and graduate from Mount Ayr Community High School in Mount Ayr, Iowa. He earned his bachelor’s degree in Elementary and Middle School Education with a focus in Mathematics and Social Studies from the University of Northern Iowa. In addition, he earned his master’s degree in Educational Administration and an Education Specialist degree from Northwest Missouri State University.

His years as a Missouri educator include four years as a middle school teacher, eight years as an elementary principal, and five years as a junior high/high school principal. Currently he is completing his fourth year as superintendent of the Rock Port R-II School District.

Ethan’s research interests include public K-12 school funding, with an emphasis on rural school districts and their educational opportunities.

While leading the Rock Port R-II School District, Ethan has also been involved in a variety of coaching positions, allowing him the opportunity to work with and learn a great deal from the students of Blue Jay Nation. When free time allows, he enjoys reading, camping at the river, and spending as much time as possible with friends whom he considers family.