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# Opportunities to Learn in Rural South Carolina Schools: Rurality, Place, and Passion

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# OPPORTUNITIES TO LEARN IN RURAL SOUTH CAROLINA SCHOOLS: RURALITY, PLACE, AND PASSION

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# ABSTRACT

High school principals can change the status quo of the current iniquitous disparities in the education system between South Carolina's rural high schools and their more populated and affluent suburban schools. Using a non-standard structure and the resources in their control, these school leaders can find solutions so schools can offer rural students advanced math and science programs. Yet, there is a paucity of studies examining how small rural school principals make advanced math and science courses available to their students, particularly in rural South Carolina. Thus, studies must examine how South Carolina school leaders successfully offer advanced math and science courses. In this exploratory multiple-site case study, I utilized the lens of complexity leadership theory to answer the question: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses? In two rural South Carolina high schools, leaders engaged the community with effective communication to generate interest and support for their dual enrollment programs. Leaders of these programs cooperated with higher education leaders to bring more advanced and diverse courses to these rural areas. Student and logistical support between the rural school and their higher education partners made dual enrollment programs available to their rural students. With more interest in these programs, the higher education partners expanded their relationship with their rural partners. Effective leaders made a difference in these schools by continuing to communicate and adjust their programs for the benefit of their students.

# DEDICATION

I dedicate this dissertation to my family, who first taught me never to quit and always to try to make the world a better place than it was when I found it. The support of my wife, Stephanie, and our children, Ella, John, and James, made this degree possible. Over the years, the belief in me of my parents, Dr. R.L. and Bonnie Sawyer, along with my siblings, Lee Sawyer, Dr. Bill Sawyer, and Cecelia Yonce, made a difference in my life. The unwavering support of these persons has resulted in my work in education and my work towards earning this degree. We all grew up in and love rural schools in South Carolina.

I also dedicate this dissertation to God. I have been blessed beyond measure in my life with family, friends, and the gift of finding something wonderful about each day. The guiding foundation of all this has been Jesus Christ. Without faith in Christ and the hope I have from this faith, I would be nothing. I would still be so blessed with His grace and mercy if I had this faith and nothing else. Thank you, Lord.

# ACKNOWLEDGMENTS

My family has a long farming, education, military, and medical history in rural South Carolina. Family, friends, and these unique rural places will always be dear to me. Without much formal education, my great-grandfather developed a hybrid cotton plant just outside Johnston, South Carolina. A great aunt founded the University of North Carolina at Charlotte from the distant rurality of Lodge, South Carolina. My daddy was a beloved rural family doctor in Saluda, SC.

I would be remiss not to thank all my teachers and coaches who guided me over the years in grade school at Wofford College, the University of South Carolina, and Clemson University. I want to thank many professionals, advisors, leaders, and friends such as Coach Mike Ayers, Dr. Joab Lesene, Dr. Linton Dunson, Dr. Wilkerson, Dr. Campbell, and Dr. Reynolds.

Many thanks to my patient committee members. My committee chair, Dr. Klar, and committee member, Dr. Sutherland, were always willing to find a way to meet with me and others to discuss our thoughts, research, and lives. Dr. Paufler and Dr. Grant, thank you for your willingness to serve on my committee. There are other teachers, professors, and friends, all too numerous to name, but I want to thank them for their belief in me and their encouragement of me on this odyssey.

Not acknowledging our past and where we come from turns our backs on how we got here, why we are, and who we are. This action possibly blinds us to a better future yet to be created with improvements learned from our collective pasts. I chose a poem I

wrote for an introductory assignment in Dr. Wilkerson's course to honor the people and places I was *raised* around and the people who *raised* me.

**"Where I come from"**

I am from Willie Lee, Lois, Granddaddy Bill, Aunt Bonnie, Uncle Buzz, my mama and daddy.

From Sunday fried chicken, rice and gravy, butter beans to shrimp creole', blackberry jam, tomato sandwiches; summer fish fries; homemade lemon ice cream and chocolate pound cake.

I am from putting trash cans in the hallway at school when it rained to catch the water; from the roar of the ocean, canvas rafts, fresh cut grass and the silence of the snow fall

I am from, "God looks after drunks and fools;" "Can't never could;" "You can't beat ignorance with a stick."

I am from Waters Avenue and a vibrant farm town, until it wasn't and the mills closed and farms were paid to plant pines. Buildings went empty; skeletons from a different time.

A radio I sang myself to sleep with; from beach music, skating rink music, country, soul, funk, rock n roll; from a worn football to learning to ride my hand-me-down bike is where I am from.

I am from paired teachers, black and white, that taught me science, math, history and to read and write. Too young to know the time and scars they shielded us from, we only knew their love and concern.

Friday night football and Saturday tailgating making faces at cars from a '76 Buick station wagon. Grabbing bottle drinks from a cooler, peach cobbler and steaks on the grill is where I am from.

Doing the best I can, wanting them to be proud of me, from hard working simple farmers, dedicated educators, and a country doctor. This is where I am from.

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# CHAPTER 1

# INTRODUCTION

As a student and later a teacher in rural South Carolina schools, I realized that rural students' opportunities to learn (OTL) were less varied and offered less advanced work than OTL in suburban and, in many cases, urban schools. In a longitudinal study on the context of high schools and the likelihood of a graduate entering a STEM degree program or field, Bottia et al. (2018) defined it this way, "We consider OTL math and science as the quantity and quality of opportunities and/or resources available at schools that could increase and/or limit students' interest in STEM fields" (p. 449). I define OTL for this study as the opportunity that rural South Carolina students have to take an advanced math or science course through Advanced Placement (AP) or a dual enrollment program in their school or cooperation with their school and a local college.

Advanced math courses in this study are similar to what Reeves (2012) defined as advanced math courses in an earlier study of longitudinal data from the National Center for Education Statistics (NCES), such as trigonometry, precalculus, and calculus (Reeves, 2012). In a more recent study of NCES longitudinal education data, Saw and Agger (2021) considered advanced STEM courses such as AP calculus, AP statistics, advanced biology, physics, and advanced chemistry as advanced math and science courses. These two studies typify the advanced math and science courses I refer to in this study.

In a study by Saw and Agger (2021), the researchers found that geographical differences in the OTL in advanced math exist between rural and small-town high school students and their suburban peers. They found that rural and small-town high school students were 20% less likely than their suburban peers to have an onsite calculus class. An OTL advanced STEM courses (AP

calculus, AP statistics, advanced biology, advanced chemistry, and physics) gap existed between rural and suburban peers from 23.2% to 37.2% (Saw & Agger, 2021). The OTL gap in these same courses is more extreme between small-town and suburban students, with a 5.7% to 53% gap in OTL (Saw & Agger, 2021). This pattern is consistent with the South Carolina data I reference later in this chapter.

Traditionally, rural students have lacked the OTL in advanced math and science courses in their rural schools (Irvin et al., 2017; Reeves, 2012; Saw & Agger, 2021). As a rural administrator, I observed how some rural high schools allow their students to take dual enrollment courses and possibly complete associate degrees by the end of their senior year. With this observation, the simple question, "Why?" began my quest for answers. Other rural schools offer advanced programs in math and science through Advanced Placement (AP) and or dual enrollment. Seeing these opportunities in some rural areas caused my question to shift from *why* to *how*.

How could one rural South Carolina High School provide more OTL in advanced math and science courses than another similarly situated school? I wanted to understand how advanced OTL was implemented in these rural South Carolina high schools. My study is focused on rural and small-town high schools.

In rural research there are varied options to define what is rural. Thier et al. (2021) proposed that there is a lack of uniformity in defining what makes a place rural. There is also a scarcity of rural research, and this, Thier et al. (2021) surmised, has led to assumptions about rural places being similar and following stereotypical or mythical rurality. A common approach in rural education research is to use the National Center for Education Statistics (NCES) definitions of rurality (Longhurst, 2022).

While Longhurst et al. (2022) found that the ease of comparing locations labeled as, for example, rural distant are easier for quantitative researchers, other researchers note that rural areas are unique places. The NCES defines town and rural locales into three subgroups: fringe, distant, and remote, with each succeeding designation getting further from an urban cluster or urbanized area (NCES, 2023). According to the NCES (2023), a town fringe designation is in an urban cluster but is up to ten miles away from an urbanized area; a town-distant designation is in an urban cluster, more than ten miles away and equal to or less than thirty-five miles from an urbanized area; town remote is inside an urban cluster and over thirty-five miles from an urbanized area.

As stated above, NCES (2023) defined rural areas in three sub-designations. A rural fringe area is a rural area that is no more than two and a half miles from an urban cluster. Rural distant identified areas are more than five miles and less than twenty-five miles from an urbanized area, but they can also be rural territories more than two and a half miles but less than 10 miles from an urban cluster (NCES, 2023). Finally, a rural, remote designated area is more than 25 miles from an urban area; additionally, these areas are more than 10 miles from an urban cluster (NCES, 2023). Though the NCES codes are suited for quantitative research, they are used often; they are often used by rural education researchers to find rural places (Longhurst, 2022). Each locale is unique and vital to the social, cultural, political, and economic community fabric (Klar & Huggins, 2020; Their et al., 2021). Decisions made by leaders in these schools impact the future of these places and their people (Budge, 2010).

The rural high school I attended prepared students well for life in our local community, our place (Budge, 2006). Our career and technical education programs were well established, and students who entered the local job market were prepared. However, our school lacked OTL in

Advanced Placement (AP) courses until the late 1980s. Like some of my family members and friends, I was unprepared for the rigor and the knowledge base required for success in college. Some of us overcame this lack of preparedness, while others fell by the wayside.

The reasons for limits in opportunities to learn in rural South Carolina high schools are some familiar noted challenges in rural communities related to low enrollment, maintaining an adequate teacher supply, and poverty levels. In South Carolina, a school is funded through local property taxes and a funding formula based on enrollment. Many rural South Carolina high schools have a limited local tax base from which to draw funding, and many of the rural schools also have low student enrollment. That the state only needed to meet a minimally adequate standard illustrated the need for a study of rural South Carolina high school leaders who did not accept minimally adequate OTL for their students.

These realities in rural education were noticed by our county's citizens and acknowledged throughout our state. According to *Abbeville v. The State of South Carolina* (1999), the public education preparing rural students for the local economy only needed to be "minimally adequate." The South Carolina Supreme Court affirmed the term as minimally adequate by citing the reference from the South Carolina Constitution. The majority opinion on the *Abbeville* case took note of the requirements in Article 11, Section 3 of the state's Constitution, which reads, "The General Assembly (state legislature) shall provide for the maintenance and support of a system of free public schools open to all children in the state" (Abbeville County School Dist. v. State, 1999). This landmark court case stated that South Carolina only needed to maintain and support the public school system minimally. With this minimal standard in mind, funding limits and teacher recruitment and retention issues, many rural South Carolina high schools must limit advanced learning opportunities.

The state's economy has changed dramatically since the filing of the *Abbeville* (State Supreme Court, 2014) case in early 1993. Today, the education system in South Carolina must prepare its students for post-secondary education and work in high-tech companies here and around the globe (South Carolina Department of Education, 2022). Business and school leaders developed goals for high school graduates in South Carolina in the *Profile of the SC Graduate* (SCASA, 2018). Over the past few years, this bulleted list has been used in school board sessions, administrator conferences, and professional development for South Carolina teachers. The brief document highlights three categories expected of South Carolina graduates: world-class skills, world-class knowledge, and life and career characteristics (SCASA, 2018). The emphasis on world-class knowledge is intended to result in high standards in languages, science, technology, engineering, and mathematics (STEM), resulting in graduates being ready for their future careers and college (SCASA, 2018).

Today, many skilled jobs in manufacturing and trades worldwide and South Carolina require some post-secondary school or specific certifications (Alic, 2018; Faulkner, 2020). However, only some rural South Carolina schools provide their students with advanced math and science courses that could provide their students with the background knowledge to earn these credentials (South Carolina Department of Education, 2022). This gulf between business associations' expectations, district superintendents' expectations, and the realities of "minimally adequate" mindsets can be startling, particularly in smaller rural schools.

This "minimally adequate" mindset (*Abbeville*, 1999) leads to deficit thinking or deficit narrative, which Biddle and Azano (2019) said is ubiquitous in rural educational research. "Minimally adequate" is a mindset that sees rural areas as not having business and public resources that more urbanized areas possess, which stems from a change in mindset that formally

occurred in the early 1900s. The "rural school problem" as a label for rural education is a term that has tainted the view of rural education since its inception in the progressive era through government reports and studies by researchers (Biddle & Azano, 2019).

The legacy of deficit perspectives in rural schooling has fostered low expectations of rural students (Wilcox et al., 2014) and "self-fulfilling" mindsets where students' talents are rarely fully developed (Del Siegle et al., 2016, p. 109). To have rigorous standards and expectations in STEM, rural principals must include ways for more opportunities to learn advanced math and science in South Carolina's public schools. Providing more OTL in rural areas is limited for various reasons. Some are due to low student enrollment and potential low demand for advanced courses, which can be part of low expectations and an ingrained deficit mentality in some rural homes. School leaders must provide OTL for rural students to overcome the mindset of a "minimally adequate" education for rural South Carolina students and meet the post-secondary education and career expectations of the SC Graduate Profile (SCASA, 2018). My background, observations, and prior research led to the formulation of my research question.

**Research Question**

The following overarching research question guided this study: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses?

**Why Advanced Courses Matter**

In this section, I synthesize research to explain why rural students and communities need access to advanced courses and programs and the barriers to universal implementation of these OTLs. Research shows that students who participate in or have exposure to OTL like advanced math, science, Advanced Placement (AP), International Baccalaureate (IB), and dual enrollment

courses in high school are better prepared for college and career training in a more competitive workforce (An, 2015; Gagnon & Mattingly, 2016; Government Accountability Office [GAO], 2018; Lavalley, 2018). Advanced math courses, for example, have proven to be a gatekeeper to some colleges' acceptance and have been an indicator of success in post-secondary education (Goldman, 2019; Irvin et al., 2017). Nationally, rural students do not enroll in advanced high school math courses at levels consistent with their previous math achievement compared to their non-rural peers (Irvin et al., 2017). The national report on rural education, *Why Rural Matters 2018-2019* (Showalter et al., 2019), showed that the OTL in advanced math and science courses is nearly 10% greater for students in suburban high schools than those in rural South Carolina high schools. The lack of OTL in advanced math and science could relate to rural students not enrolling in these courses.

A lack of advanced course offerings may result in lower math achievement. The NAEP data used by Showalter et al. (2019) showed that rural students' achievement improvement between grades four and eight is similar to that of their non-rural peers. However, Showalter et al. (2019) pointed out that the high school achievement gap on the NAEP math tests between South Carolina's non-rural students and rural students is among the highest in the country. Fewer course offerings and less achievement could result in these rural students not being as prepared as they could be for life beyond high school.

In a policy brief for the Education Commission of the States, Mann et al. (2017) noted that the gap between urban, suburban, and rural schools offering AP courses has narrowed over the last 20 years in the United States. However, gaps in opportunities for learning remain. Nationally, 73% of rural schools offer AP courses to their students, whereas urban and suburban schools offer AP to their students at a rate of over 93% (Mann et al., 2017). Regarding AP

science, technology, engineering, and math (STEM) courses, only 62% of US rural school students have access to them (Mann et al., 2017). In comparison, 92% of their peers in suburban schools have this opportunity (Mann et al., 2017). This opportunity gap disadvantages rural students when competing for college admittance and scholarships (Goldman, 2019; Lavalley, 2018). This research affirms the local reality that rural students are less likely to attend post-secondary institutions than non-rural school peers (Lavalley, 2018).

One possible way to prepare students better for life after high school is through dual enrollment courses. Dual enrollment means a student in high school is also taking at least one course from an institution of higher education, therefore being dually enrolled in two institutions. In a review of the statewide implementation of dual enrollment courses in Tennessee, researchers Hemelt and Swiderski (2021) studied the impact of dual enrollment. A portion of their title appropriately termed dual enrollment as when "college comes to town" (p. 1), meaning college courses are available to high school students. While this is a simplistic view, dual enrollment courses can be taken at a traditional high school through face-to-face instruction from a college instructor or synchronously or asynchronously through virtual technology.

In reviewing data from a national survey, An (2015) concluded that dual enrollment courses prepare students for the academic transition to college. Students taking dual enrollment courses were better prepared for and more successful in their first year of college than their non-accelerated counterparts, and they were slightly more successful than their AP/IB exam-based credit peers (An, 2015). The dual enrollment courses have been found, at least in Tennessee, not to harm AP course enrollment when similar courses are offered in both AP and dual enrollment (Hemelt & Swiderski, 2022). This study's dual enrollment students did not take AP courses in previous years. Dual enrollment was reaching more rural students with more rigorous courses.

In another study, An (2013) found that students taking dual enrollment courses in high school were 38% more likely to earn a bachelor's degree than those who were not. Other research supports these findings; students who participate in, or have exposure to, AP and dual enrollment courses in high school are better prepared for post-secondary options (e.g., Gagnon & Mattingly, 2016; U.S. Government Accountability Office, 2018). This meant the expansion of rigorous college-level courses through dual enrollment to students that AP programs had been unable to reach. Unfortunately, in this same study, Hemelt and Swiderski (2022) found that this expansion did not mitigate the OTL gaps in course offerings between smaller and larger schools.

The opportunity to learn through advanced math and science courses in high school is particularly significant for college and career access. Rural students face a lack of opportunity to take higher-level math courses such as calculus and trigonometry (Irvin et al., 2017), part of the group of gatekeeper courses (Goldman, 2019), especially for highly selective colleges (Gagnon & Mattingly, 2016). These courses indicate potential success in post-secondary education (An & Taylor, 2015; Goldman, 2019; Irvin et al., 2017). Nevertheless, Irvin et al. (2017) found in a regression analysis of longitudinal data that students in urban areas have more opportunities to take advanced math courses than non-rural peers. Access to advanced math and science courses and programs is less likely in small towns and rural high schools even though, in a regressive analysis of national data by Saw and Agger (2021), results revealed that these students were virtually equal in the ninth grade regarding having a career in STEM. Saw and Agger (2021), working with data from the High School Longitudinal Study of 2009, found that rural and small-town students do not have the OTL in advanced math and science compared to their suburban counterparts.

Many high schools in South Carolina are coded rural or small-town high schools (NCES, 2021). Failure to address the disparities in OTL via AP/IB or dual enrollment in advanced math and science may reduce rural students' potential. Less exposure and fewer STEM activities in rural and small-town schools result in lessening interest in STEM careers, which are increasingly important jobs in these areas (Saw & Agger, 2021). STEM-related careers are needed or will soon be in demand in the rural areas where we have seen new mining towns, oil and gas production, agricultural expansion, management of natural resources, and in some cases where manufacturing has moved from densely populated locations out to small-town rural areas (Saw & Agger, 2021). Azano and Biddle (2019) proposed that teachers and school staff use the place of the community to teach from, honoring local knowledge and resources while teaching global concepts. Rural students who may desire to stay in their community for various reasons could help these areas with more STEM opportunities, and in schools, a step in the right direction is OTL in advanced math and science courses.

Goldman (2019) and Irvin et al. (2017) noted that even if rural students wish to attend college, they need a cadre of foundational courses in math and science. Without parents and community members pushing school and district administrators to provide access to OTL in more advanced courses, these rural students may not have the academic background to be ready for college work. Access to post-secondary pathways appears to influence multiple generations in rural areas. LaValley (2018) found that rural students from homes where adults did not have a college education were 51% less likely to attend a college than similar non-rural homes. In a national study of rural youth and college attendance, Byun et al. (2017) found that parents with less education are likelier to have students who do not aspire to earn a college degree or attend college. The disparity in OTL is examined and displayed in Chapter Two. However, having less

OTL in rural areas will not suddenly produce students who spontaneously aspire to STEM careers or college education (Saw & Agger, 2021). Few rural students will have a STEM career if the courses and focus are unavailable in their schools.

In contrast, research suggests that equality in educational opportunities will help mitigate racial and class inequality in future generations (Chen, 2015). Suburban schools have more OTL in advanced math and science, perpetuating inequities between these schools and rural high schools (SC DOE, 2022). The continuation of inequities in educational opportunities among the state's public schools will ensure that all students will continue to live in a world of haves and have-nots in South Carolina.

## Rural High Schools

As Klar and Huggins (2020) pointed out, various government agencies have various definitions of a rural area, and some of those agencies have adjusted their terminology in the recent past. In the United States, the terms rural-distant, rural, small town, metro, urban, and others can be confusing (Showalter et al., 2017; Snyder et al., 2019). Colodarci (2007) believed that rural researchers need not be overly concerned with a standard definition of what rural is but that researchers "should carefully describe the context of their investigations" (p. 2). In examining what a rural school is in this section, I focus on some elements associated with rurality, including rural schools with low student enrollment, the location of rural high schools, advanced courses, and educational trajectories.

### *Low Enrollment*

Low student enrollment is often due to the school's rurality and sparsely populated attendance area. Due to state funding formulas, this predicament results in less funding to a school with low enrollment. These are critical elements in offering more equity of OTL in

advanced math and science courses in rural high schools. In two national studies, Lavalley (2017) and Showalter et al. (2017) stated that the graduation rates in rural areas are high. Still, the rural graduates' college attendance rate is lower than that of urban and suburban students. More recently, rural schools with less than 500 students in the South produced 93,000 graduates (EdGov, 2021). In South Carolina, 86 high schools enroll fewer than 500 students (SCHSL, 2021). Most of these schools are rural. These rural schools provide courses for high school graduation but are not equitable in OTL advanced courses, including math and science, compared to more suburban and urban schools.

***Location***

More information is provided on these schools in Figures 1.1 to 1.3. According to NCES locale coding, as delineated in Figure 1, schools in South Carolina fall into the following categories: Town Fringe, Town Distant, Suburb Small, Suburb Midsize, Suburb Large, Rural Remote, Rural Fringe, Rural Distant, City Small, and City Midsize. The most significant classifications in South Carolina are rural fringe, suburban large, rural distant, and town distant. The locale codes were derived from the National Center for Education Statistics (NCES) database search using the criteria of South Carolina traditional schools that have the 12$^{th}$ grade. This data set is from the 2020-2021 school year. The number of schools in each NCES classification is noted in Figure 1.1

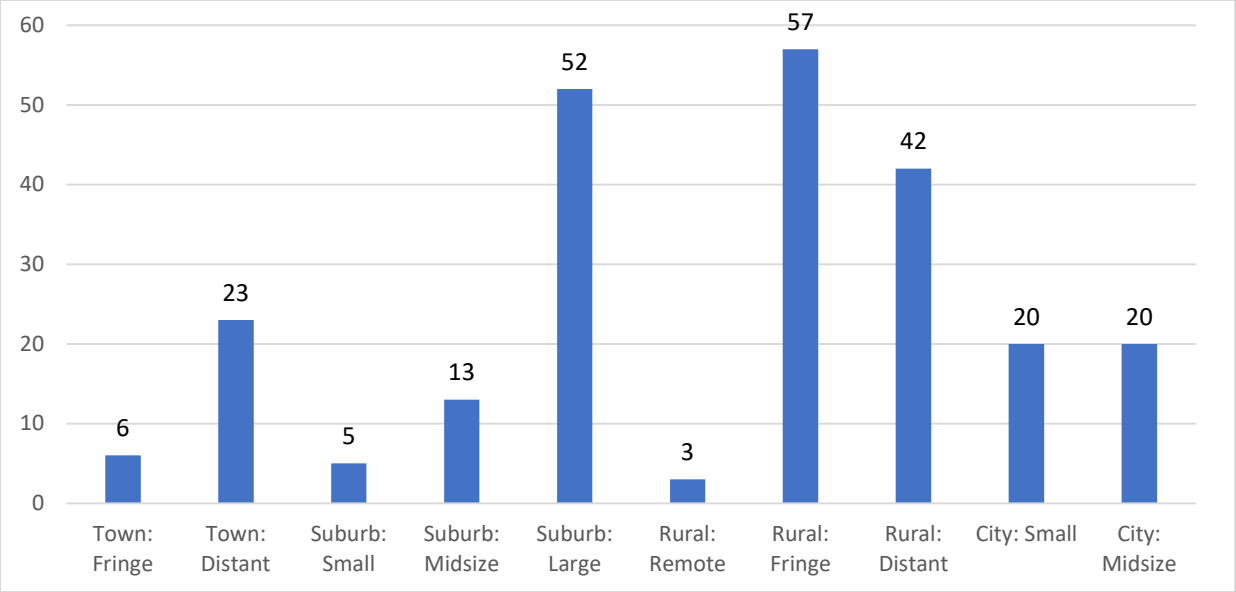


***Figure 1.1. South Carolina Count of Schools by NCES Classifications (National Center For Education Statistics, 1998).***

For a quicker comparison of this data into broader NCES categories, I have included Table 1.2, which combines more specific codes into broader town, rural, suburb, and city. This unified data highlights the impact research on rural and town schools could have on many schools and students in South Carolina and possibly the United States. Some researchers combine rural and town-coded locales when conducting "rural" research (Saw & Agger, 2021). I did this in the current study as well since both labeled schools serve rural students.

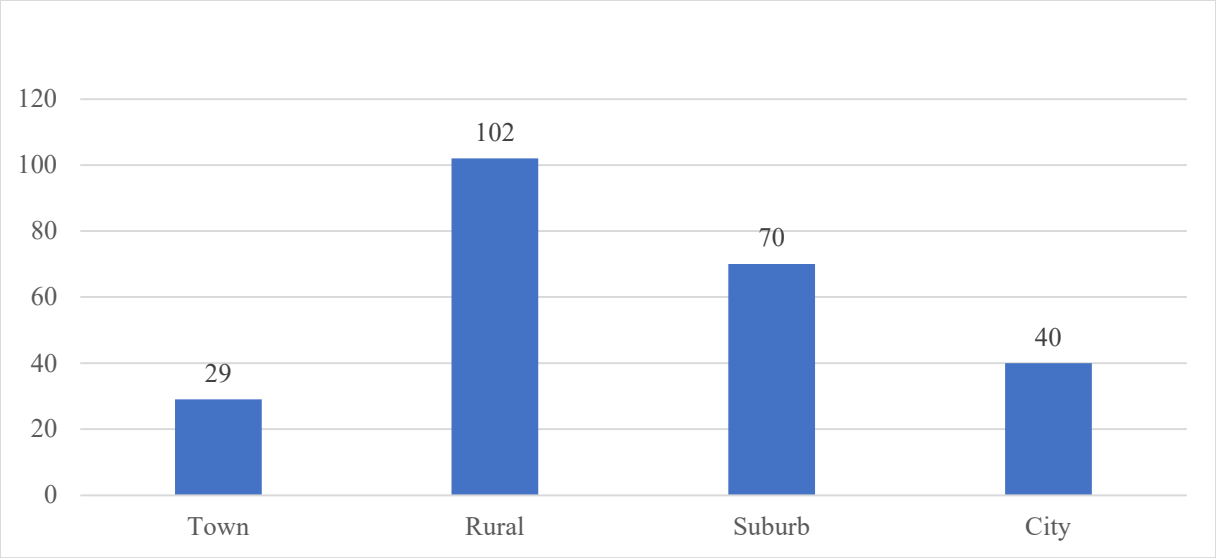


***Figure 1.2. South Carolina Schools by NCES Locale Code. The number of schools in each category appears at the top of the associated column (National Center For Education Statistics, 1998).***

### *Advanced Courses*

The average number of AP courses per school in each class came from the total courses in each classification code divided by the number of schools in each class. Schools listed as suburban schools averaged nearly 12 AP courses. Schools labeled as city schools averaged 8.4 courses. Rural schools averaged 6.2 courses, while town schools averaged 5.4 AP courses.

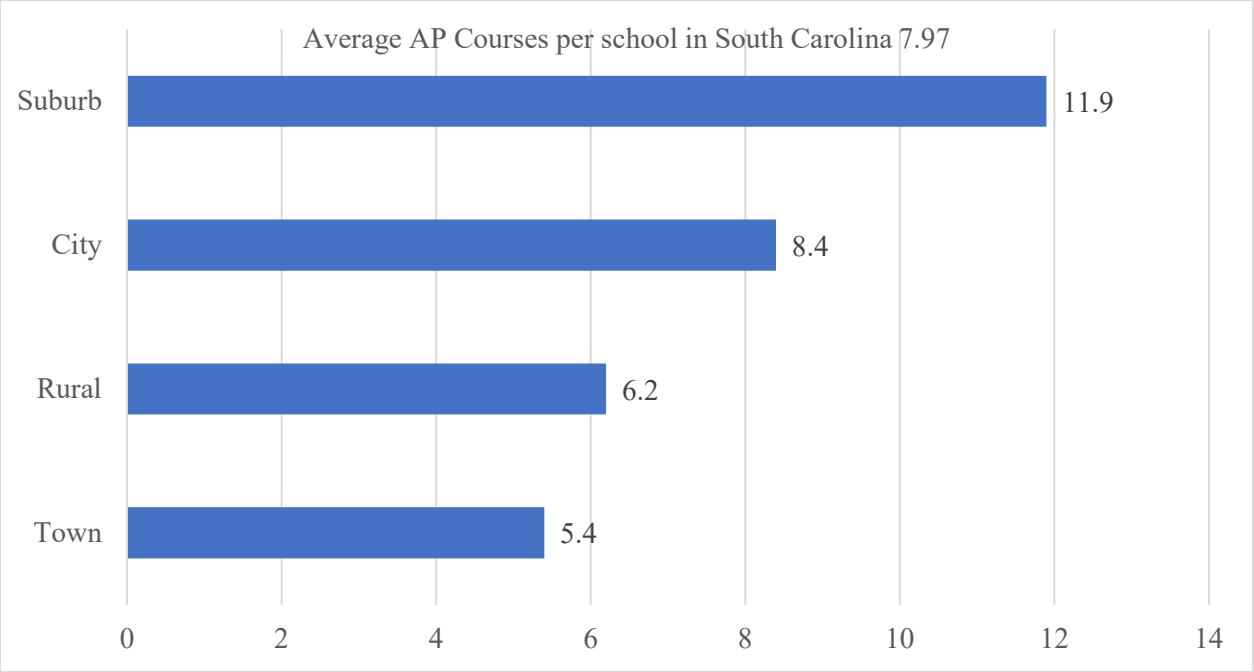


***Figure 1.3. Advanced Placement Course Per South Carolina High School by Location (National Center For Education Statistics, 1998).***

In Table 1.1, the data is further examined by adding more specific divisions of the NCES locale codes, as shown below under locale 2. This table illustrates the total number of 11th and 12th graders in each locale category. The total number of students taking AP math from this group is calculated. The percentage of students taking these courses in each category is shown on the far right of this table.

In Table 1.1, a higher percentage of students in city and town schools took AP math. The suburban students have similar percentages as the city and town students except for the small suburban schools. The schools making up this category are from the Sumter and Darlington districts along Interstate 95 and Anderson Five, located near Interstate 85. This category could warrant future research on course offerings for these students and those from smaller suburban areas.

As can be seen in the rural category, the total student population rivals the suburban student population and is much larger than the population labeled city students. While the numbers are in the realm of total students shown in the suburban category, the percentage of students taking AP in rural areas is significantly lower. This data suggests that fewer rural students are taking AP math.

***Table 1.1***

*South Carolina Public High School Students Taking AP Math*

| Locale 1 | Locale 2 | Sum of AP mathematics students | Sum of 11th and 12th Grade Population per category | % of the 11-12 Population taking AP math |
|---|---|---|---|---|
| **Rural** | Fringe | 1760.0 | 26519.0 | 6.6% |
| | Distant | 192.0 | 7142.0 | 2.7% |
| | Remote | 0.0 | 74.0 | 0.0% |
| **Town** | Fringe | 190.0 | 2369.0 | 8.0% |
| | Distant | 763.0 | 7484.0 | 10.2% |
| **Suburb** | Small | 117.0 | 2660.0 | 4.4% |
| | Midsize | 666.0 | 8231.0 | 8.1% |
| | Large | 2144.0 | 22945.0 | 9.3% |
| **City** | Small | 794.0 | 9458.0 | 8.4% |
| | Midsize | 650.0 | 5471.0 | 11.9% |

(National Center For Education Statistics, 1998)

As can be seen in Table 1.2, similar delineations were made using the same parameters above. In this table, the data on courses focus on AP science courses. The percentage of students taking AP science fell sharply compared to how many in this category were taking AP math. In the rural sector, the percentage of those students taking AP science rose slightly. The large

suburban category was also above its AP math participation percentage. Future studies of potential careers and the proximity of these schools to major industries in the area may provide insight into these numbers.

***Table 1.2***

*South Carolina Public High School Students Taking AP Science*

| Locale 1 | Locale 2 | Sum of AP science students per category | Sum of 11th and 12th Grade Population per category | % of the 11-12 Population taking AP Science |
|---|---|---|---|---|
| **Rural** | Fringe | 1951.0 | 26519.0 | 7.4% |
| | Distant | 251.0 | 7142.0 | 3.5% |
| | Remote | 0.0 | 74.0 | 0.0% |
| **Town** | Fringe | 156.0 | 2369.0 | 6.6% |
| | Distant | 434.0 | 7484.0 | 5.8% |
| | Small | 174.0 | 2660.0 | 6.5% |
| **Suburb** | Midsize | 511.0 | 8231.0 | 6.2% |
| | Large | 2519.0 | 22945.0 | 11.0% |
| **City** | Small | 849.0 | 9458.0 | 9.0% |
| | Midsize | 511.0 | 5471.0 | 9.3% |

(National Center For Education Statistics, 1998)

The data points in Table 1.3 show the number of students enrolled in dual enrollment courses and the total number of students in the 11$^{th}$ and 12$^{th}$ grades in each NCES locale-coded school category. The percentage of each locale's students taking a dual enrollment course is tabulated in the far-right column, as in the previous tables. Regarding the percentage of students taking dual enrollment, the numbers are much higher for students in rural areas. Also, the

percentage of students in town-coded schools was higher than in the AP categories except in the AP math category.

***Table 1.3***

*South Carolina Public High School Students Taking Dual Enrollment*

| Locale 1 | Locale 2 | Sum of Dual Enrollment | Sum of 11th and 12th Grade Population | % of 11-12 Population |
|---|---|---|---|---|
| **Rural** | Fringe | 2430.0 | 26519.0 | 9.2% |
| | Distant | 562.0 | 7142.0 | 7.9% |
| | Remote | 7.0 | 74.0 | 9.5% |
| **Town** | Fringe | 203.0 | 2369.0 | 8.6% |
| | Distant | 465.0 | 7484.0 | 6.2% |
| **Suburb** | Small | 261.0 | 2660.0 | 9.8% |
| | Midsize | 612.0 | 8231.0 | 7.4% |
| | Large | 1402.0 | 22945.0 | 6.1% |
| **City** | Small | 993.0 | 9458.0 | 10.5% |
| | Midsize | 116.0 | 5471.0 | 2.1% |

(National Center For Education Statistics, 1998)

The data in Table 1.4 represents the percentages of the 11$^{th}$ and 12$^{th}$-grade students who took an AP-designated course that was not math or science. Broad differences in courses taken are present in some locales. The more distance from densely populated areas, the fewer opportunities students have to take advanced courses. This data represents the variations in participation in AP courses other than math or science in South Carolina high schools, which are required to offer at least one AP-designated course.

***Table 1.4***

*SC Students taking an AP course other than math and science*

| Locale 1 | Locale 2 | Sum of Other AP subjects | Sum of 11th and 12th Grade Population | % of 11-12 Population |
|---|---|---|---|---|
| | Fringe | 8776.0 | 26519.0 | 33.1% |
| **Rural** | Distant | 797.0 | 7142.0 | 11.2% |
| | Remote | 0.0 | 74.0 | 0.0% |
| **Town** | Fringe | 589.0 | 2369.0 | 24.9% |
| | Distant | 827.0 | 7484.0 | 11.1% |
| **Suburb** | Small | 215.0 | 2660.0 | 8.1% |
| | Midsize | 2674.0 | 8231.0 | 32.5% |
| | Large | 8374.0 | 22945.0 | 36.5% |
| **City** | Small | 2462.0 | 9458.0 | 26.0% |
| | Midsize | 2099.0 | 5471.0 | 38.4% |

(National Center For Education Statistics, 1998)

As policymakers and the public focus on standardized tests to determine success, some rural schools retract their curriculum, as pointed out decades ago by Haller and Monk (1988). In light of state requirements for specific subjects for graduation, schools ensured staffing and course offerings that helped prepare students first for graduation and standardized tests; in rural areas, this often meant cutting technical and advanced courses to save FTE positions (Haller & Monk, 1988). In a study of Florida schools and factors determining if a school can offer AP/IB level courses, Iatarola et al. (2011) found that the smaller the school, the more likely the school is to offer courses that lead to graduation as a priority.

Schools must have a curriculum that offers a pathway for students to graduate. Schools, first and foremost, establish staffing and materials for these courses. More current research affirms what Haller and Monk (1988) noted; often, there is not enough funding, staffing, or demand for courses to provide students with AP or dual credit courses in math or science (Brent et al., 2004; Gagnon & Mattingly, 2016; Logan & Burdick-Will, 2017; Price, 2020). In a quantitative study of AP course expansion, Kolluri (2018) reported that marginalized populations are less likely to take AP courses or go to a school that offers a variety of AP courses. Some states, such as Texas, California, and Florida, have offered districts incentives to offer more advanced courses to students (Kolluri, 2018). Some rural schools shrink advanced course offerings to increase student graduation rates and test scores (Iatarola et al., 2011). Thus, students in rural schools may not benefit from comprehensive, advanced programs (Price, 2020). Increasing the OTL in these rural schools could create more equity in advanced course OTL for rural students in a lower community income area, similar to their peers in more affluent suburban schools (Kolluri, 2018). Due to enrollment size, differentiated tax bases, and community interests, a rural school may not offer students as varied a curriculum as a larger district can provide.

Advanced OTL, when available to them, allows rural students to stretch themselves academically through advanced course offerings in their rural high schools (Kolluri, 2018). Opportunities to take advanced courses are not only for college-going students but also for students preparing to pursue careers after high school (Faulkner, 2019). In a mixed methods study reviewing the benefits and challenges of strengthening science and math courses in Texas, Alford et al. (2014) found that the often-used terms career ready and college ready are

synonymous in today's application. More advanced coursework, such as AP (Kolluri, 2018) and dual enrollment, raise the entire school's academic outlook.

### *Educational Trajectories*

South Carolina high schools' student demographics, enrollment, and poverty statistics highlight an educational disadvantage defined previously and is pertinent to this state. By percentage, rural students in South Carolina are more impoverished than many rural students, particularly in states outside of the South (NCES, 2021; Showalter et al., 2019). In public South Carolina schools, 15.9% of students attend rural schools, and half of this group are minoritized students (Lavalley, 2018; Showalter, 2017). Of these rural South Carolina students, 68% live in poverty (Showalter et al., 2017; Showalter et al., 2019). Students in a school with these demographics are less likely to have a group of qualified staff that can teach AP or dual enrollment math and science (Kolluri, 2018).

These rural schools also tend to have a lower tax base. The local tax base in many states provides a large portion of school funding for course offerings and student support (Tieken & Auldridge-Reveles, 2019). In their literature review of school closings across various settings, Tieken & Auldridge-Reveles (2019) suggested that funding formulas applied to rural and urban areas are so varied that they are "creating dramatically divergent educational opportunities for students" (p. 919) in these locales. In educational finance research on South Carolina's efforts in a recruiting and retention initiative, Tran and Smith (2021) reported that spending in this initiative primarily concentrates on recruiting and less on retention of teachers in South Carolina's more impoverished areas exacerbating staffing issues (p. 153). This scenario helps perpetuate a lack of OTL in many rural South Carolina schools.

The lack of OTL in advanced math and science AP or dual enrollment courses at a small rural high school puts these students on a different educational trajectory than peers in a larger,

populated, more extensively staffed, and more suburban school (Gagnon & Mattingly, 2016; Grant et al., 2024; Price, 2020; Wells et al., 2019). Offering an advanced course in math and science does not equal a higher graduation rate, but the school's heightened expectations set a tone for academic success. A hypothesis in this study was that certain leadership practices in rural school principals can overcome the disadvantage of an iniquitous history and increased poverty, as some rural South Carolina schools can still offer their students advanced math and science courses through AP or dual enrollment despite poverty, race, and rurality.

**Challenges to Implementing OTL**

Public education policies contribute to the age-old disparity between rural and suburban-urban students. Education movements and policies, beginning in earnest in the early 1900s, were designed to do the best for the most people (Biddle & Azano, 2016). This system is the way most policies are written today. Unfortunately, policy writers do not create a system that encourages adaptation and specialization depending on a rural area or small community's context, scope, and contextual tensions (Brenner, 2022; Klar & Huggins, 2020). Instead, rural residents must deal with the consequences of one-size-fits-most education policies (Azano et al., 2017; LaValley, 2018). Just like clothing labeled as such, a one-size-fits-most education policy fits no one well and is not as effective in its operation as it could be. Rural areas have different needs than suburban and urban areas, where many American students attend school (Brenner, 2022; Showalter, 2019).

These few examples highlight how many policymakers have grown up disconnected from and mostly blinded to rural realities because "the metropolitan experience and political commitments of contemporary policymakers mean that state education, taxation, and resource policies usually ignore rural realities" (Johnson & Howley, 2015, p. 227). Johnson and Howley

(2015) expanded on Brenner's (2006) idea that a researcher must consider whether a policy will impact all of its intended places of focus in the same way. Nevertheless, education policy and funding are designed for non-rural contexts (Johnson & Howley, 2015). The policies that attempt rural school reform often accomplish the opposite effects than the policy intended (Johnson & Howley, 2015).

### *Funding*

In South Carolina, few schools qualify for federal rural-specific funding, and this state has over 20% of rural students in poverty, and 40% of the schools are coded as rural (Showalter, 2019). An example of a government program that assists in educating children living in economically disadvantaged backgrounds is the 2015 Every Student Succeeds Act (ESSA). Part of this act is Title I; through it, states receive funding from the federal government to help educate students from low-income households to high standards (Every Student Succeeds Act, 2015). If over 40% of its enrollment meets a low-income standard, a school may implement schoolwide programs to serve all students and raise achievement (Every Student Succeeds Act, 2015). If enough students in a school are from this economic background, the whole school is classified as a Title 1 school. These schools are eligible to receive additional funding. With this in mind, a hurdle to overcome in offering more OTL in advanced math and science is that no funding source is stable enough to establish programs to address a possible lack of these advanced courses.

In South Carolina, a policy requires that an AP course be offered to high school students (Mann et al., 2017). This idea sounds good in theory, but it does not consider the needs of a specific area. Rural areas with few or no qualified persons to teach advanced courses, particularly advanced math and science courses, may cause resources to be removed from other areas of need, possibly exacerbating a funding issue such as recruiting, hiring, and retaining

qualified AP instructors. When a school offers an AP or dual enrollment program, the rigor and expectations may be raised schoolwide. When advanced coursework is required, as in Michigan, where Jacob et al. (2017) found some positive effects academically and socially for higher achieving students, the impact on lower achieving students was frustration, and some dropped out of school. This study also highlights the negative side of some mandates. Jacob et al. (2017) found that lower achievers were likelier not to finish high school when required to take advanced coursework. Had the mandate considered the needs of various communities or given local leaders some leeway in implementation, unintended consequences may have been minimized.

Mandates from national or state governments are examples of one-size-fits-all policies. According to Azano et al. (2017) and LaValley (2018), these policies can have a somewhat opposite effect. In South Carolina, which mandated offering at least on AP course at each high school, available funding may be used to recruit a highly qualified instructor for a few students taking an AP course. That means at least one less class is available for possible required courses for graduation. This policy results in higher enrollment numbers in the remaining classes needed for graduation.

### *Recruiting Qualified Staff*

Recruiting and retaining quality teachers to teach advanced courses is an issue in rural areas (Oyen & Schweinle, 2020). Teachers of advanced courses in rural areas cite several strains and issues of concern. For many, these are the reasons they leave rural education. The lack of professional development, multiple subject preparations, and less available support from the administration are issues in rural education (Oyen & Schweinle, 2020). These concerns and resulting teacher shortages are part of the reason that, nationally, rural students have a 20% lower opportunity to take an AP course in their school and a 30% lower opportunity to take a science or math AP course than their suburban and urban peers (Mann et al., 2017).

Rural students are identified as gifted at lower rates than students from suburban areas (Del Siegle et al., 2016). Del Siegle et al. (2016) studied barriers to identifying underserved students and found that the identification process for gifted students does not take into account student diversity; as a result, fewer rural students are designated as gifted. The lack of a non-mainstream gifted identification process in rural settings equates to fewer students recognized as gifted (Azano et al., 2017; Lavalley, 2018), which means less funding for rural schools. A non-mainstream gifted selection process helps identify under-served populations and other rural students who may be gifted (Azano et al., 2017; Lavalley, 2018). The school funding system in South Carolina is currently a per-pupil system, which would award a slightly higher amount of state funding per student identified as gifted and talented (Augenblick et al., 1997). This process can create more funding for rural schools and district leaders to help provide advanced programs for these students.

If a school leader has funding for a program, they still must find teachers certified to teach AP or dual enrollment courses. These teachers typically have more years of teaching experience than other teachers due to the necessary qualifications to teach these courses. In a quantitative study on advanced science course qualified teacher retention patterns over five years, Palermo et al. (2021) found that these teachers are hard to find and recruit in rural areas where they may teach several different courses. Several different preparations for the day and the higher pay in suburban districts have resulted in rural high schools losing and trying to replace experienced teachers (Palermo et al., 2021). This problem is another hurdle for rural principals to negotiate if they wish to provide advanced OTL to rural students.

The issues of lack of non-mainstream gifted identification processes (Azano et al., 2017; LaValley, 2018), teacher inexperience, and teacher recruitment and retention (Biddle & Azano,

2016; Lavalley, 2018) are an abridged list of why rural students lack the OTL that their suburban and urban peers receive. However, some rural school principals and some superintendents have found creative solutions to provide OTL to their students. These leaders are the focus of my study.

**Rural Leadership**

Rural school leaders can be key in providing AP and dual enrollment courses, which are synonymous with rigor and are a part of the college entrance process (Goldman, 2019; Iatarola et al., 2011). In rural South Carolina, high school leaders are vital in enabling an environment where solutions can germinate. Solutions in rural areas may not be the same as urban-centric solutions used on issues that arise in schools with a larger enrollment, more funding, and more staff.

In rural areas, the schools are part of the community identity, and the community permeates into the school hallways and classrooms. Rural school leaders must be skilled in welcoming the community into the school in what is a mix of hope, vision, and required standards. Bauch (2001) called this a "school community partnership" (p. 205), which translates well in some rural communities. The rural principal may do well to honor the traditions of place while supporting students academically (Bauch, 2001; Budge, 2010). Sutherland et al. (2022) and Bailey (2020) suggested that bridging social capital may be used and needed by rural school leaders as they fit into the role of the principal in a rural community, particularly if the leader is from outside the community. These rural school leaders and some rural superintendents must try to develop at least a working relationship with the people in the district for all parties to thrive. It is a symbiotic relationship.

In their 2017 work on successful leadership in rural schools, Preston and Barnes (2017) found that many rural school leaders are people-centered and do not fear change if they feel it is needed. Similarly, Biddle and Azano (2016) found in their review of research on the infamous "rural school problem" that personal relationship skills are vital to creating opportunities and driving community support for schools in some areas. In other words, a rural school leader should be adept at cultivating relationships. The more skilled these leaders can be at working in and being visible in the community, the more likely they will produce positive support for the school. As the principal involves themselves in the community, the relationship-building and involvement make their efforts to progress and change more likely to be supported.

Like large trees whose roots reach deep and whose life and eventual death are not swayed by drought, flood, or small winds, a rural community holds firm to its history, often glossing over the bitter to point out supposed bright points of the past. Sometimes, needed change is delayed in work, such as in educational equity for rural students. In a qualitative case study by Sutherland et al. (2022) involving a small Southern K-8 school, the researchers made the case that leaders coming into a community without a connection face a quick test of their rural social capital, which is common in many rural areas. In a recent study of an assistant principal's journey through a micropolitical minefield in a rural area, the administrator was introduced as a local to a community member (Bailey, 2020). When questioned, the new administrator's answer revealed his place when the response was blunt, "oh, you're from town" (Bailey, 2020, p. 1). I hypothesize that an accepted, local, connected administrator, teacher, or other school leader comes in with a degree of social capital, or at least they understand the contextual nuances of the local area.

Preston and Barnes's (2017) literature review of research from a decade of rural school leadership defined social capital as "any personal or professional bond or network a person has with other people or organizations." (p. 10). Social capital is not automatically given to a teacher or administrator in a rural school; it must be earned (Anderson & White, 2011). Administrators could develop this social capital through conversations and meetings to alleviate an issue and avoid direct conflict (Faulkner, 2020).

Bauch (2001) pointed out that rural school leaders may be more open-minded to a community partnership than urban school leaders, which affirms rural schools' connections with the community. Many leaders may not fully understand the importance of caring for certain elements (Budge, 2010) or the micropolitics of a rural community (Bailey, 2020). Biddle (2021) suggested,

> Stronger frameworks for rural leadership practice that focus on the interaction between the rural context and institutional priorities of schools could help rural school leaders better leverage the strengths of rural schools and communities to define and meet institutional and community goals for rural young people in ways that foreground equity and social justice. (p.123)

Producing more OTL in advanced courses may help with what Biddle theorized could give more rural students and communities a more equitable educational system and more social justice.

In rural areas researched in Hall and McHenry-Sorber's (2017) work in the northeast of the US revealed that a rural superintendent over several small rural districts and those districts' principals spent most of their time on public relations and political work to get things done in the districts with local boards in their communities. The superintendent in this study also enabled the local principals to find solutions to offer a new program through the school, and each solution

was unique to the needs of each community (Hall & McHenry-Sorber, 2017). Instead of a top-down solution, enabled school leaders presented a locally accepted solution that was best for their school and presented these plans to their local boards (Hall & McHenry-Sorber, 2017). This work built social capital with the local community by allowing local or bottom-up solutions. As my study is on the practices of rural school leaders, a parallel can be drawn in some rural studies due to shared characteristics relative to rural leadership. This idea is a tenant of the guiding theory of my study, complexity leadership theory (CLT) (Marion & Gonzales, 2014).

**Local Context**

In South Carolina, rural students do not take as many advanced courses as their peers in other states. In the state, a rural high school student has a 17.6% likelihood of having a dual enrollment course on their transcript instead of the national rural average of 23.1% (Showalter et al., 2019). The percentage of rural junior and senior students in South Carolina who achieve a passing score on one AP exam is 8.2%, compared with the 9.5% national rural average (Showalter et al., 2019). These numbers could change if rural school principals found ways to bring AP or dual enrollment courses to their schools.

Graduation rates are always used as an accountability measure for high schools. Rural schools are not exempt from this metric either. In South Carolina, 85.2% of rural students graduate, while in the U.S., the rural graduation rate is 88.7% (Showalter, 2019). This data indicates that rural students in South Carolina are slightly behind the national rural graduation rate in the United States. In South Carolina, schools are required to offer an AP course (Mann et al., 2017), but students are not required to take the course. Many rural area schools in South Carolina have increased dual enrollment offerings to boost their rigor using an accepted collegiate norm.

My research focuses on the high school principal, or other rural school leaders' role in securing or continuing AP and dual enrollment courses at their schools and the process involved. Using effective leadership practices, some rural South Carolina high schools offer these courses despite the circumstances related to their location, enrollment, and socioeconomics. Some rural school leaders find ways to offer advanced math and science courses to their students. Where this has taken place is critical to my study.

As Biddle and Azano (2019) detailed in their theoretical work, there should be a focus on rural areas as unique places with different needs than some needs in more populated areas. More research is needed to examine the advantages of place-based schooling, which is a more local and, to some extent, more rural focus (Biddle & Azano, 2019). Rural-focused research on science, technology, engineering, and math subjects (STEM) and how these subjects mesh with the rural environment (Gallay et al., 2016) is intriguing. Some rural researchers, like Gallay (2016), point out that STEM is part of life in manufacturing, agriculture, mining, fisheries, and other typical rural place vocations. This concept is an example of a place-based educational movement. Rural school leadership research meshes with this line of thought, as rural leaders must also consider the community context of their schools (Klar & Huggins, 2020). My research considers these pathways and how some rural school leaders in South Carolina enable their schools to offer their students advanced science and math courses.

In Chapter 2, I explain how I used complexity leadership theory (CLT) to investigate how rural South Carolina high school leaders can offer their students advanced math and science courses designated as AP or dual enrollment. Research is needed to understand how rural South Carolina high school leaders use the tenets of CLT to secure or maintain advanced OTL math and science for their students. There is no research available on this topic.

This research is needed to gain information on rural principal leadership in small-enrollment high schools. The discovery of the methods and strategies for involving students, faculty, staff, and possibly other stakeholders that led to more OTL for rural students will advance rural education leadership. This study should not be a one-size-fits-all answer to all rural education leadership issues. Rural research is less generalizable than mainstream education research (Azano et al., 2017). Rather, this work and the idea about what rural education research can gain is tempered by the realities and uniqueness of rural America and, specifically in my research, the uniqueness of South Carolina's rural schools.

**Purpose**

For students in rural areas in South Carolina, there are typically fewer advanced courses available to take (NCES, 2021; SC DOE, 2022). The reasons highlighted above, such as funding formulas (Augenblick, 1997), available staff (Palermo, 2021), community context (Klar & Huggins, 2020; Sutherland et al., 2022), and resources needed for these courses and programs, make the job of offering these courses difficult for principals in many rural locations. These courses are needed to provide a depth of knowledge for rural South Carolina students so they can meet the criteria in the state's Profile of the South Carolina Graduate (SCASA, 2018). These students will be more college and career-ready due to their OTL in advanced math and science courses (Goldman, 2019). Without advanced OTL, rural students would remain products of an iniquitous system where their location and school size are discriminatory factors in determining if they have access to courses similar to those of their suburban peers.

However, researchers do not understand how rural South Carolina high school leaders specifically provide advanced OTL. Some leaders can still implement OTL advanced math and science despite the policy and funding challenges. Understanding how rural leaders can

implement OTL will enable other principals and rural leaders to explore possible solutions in their community that could lead to more rural students having more OTL. Policymakers typically write a policy that does the best for the most people; the same holds true for education policy (Biddle & Azano, 2016), and their view is typically rooted in the deficit mentality of what rural areas are not and what they lack (Cubberley, 1922) as formulated over 100 years ago and still a thriving thought today.

Research is emerging on CLT in educational fields. My study addresses how rural high school principals use CLT tenets to bring more OTL to rural South Carolina high school students. This research is needed to identify ways that rural school leaders enable the formal or informal leaders around them to produce solutions to problems (Corley, 2021). As such, this study asked the following research question: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses?

To accomplish this task, these rural high school leaders, I hypothesized, use CLT, which has three leadership realms. These realms have "fuzzy boundaries," and the lines between informal and official leaders are blurred (Uhl-Bien & Marion, 2009, p. 633). CLT theorists stress that the formality and rigidity of traditional bureaucratic leadership structures do not allow for creative and efficient problem-solving (Uhl-Bien & Marion, 2009; Marion & Gonzales, 2014). The rural principal is the enabler in this system, creating a congenial environment for the adaptive leadership realm, which can produce solutions from a ground-up perspective. This process is necessary to produce a solution acceptable to the administrative leadership realm, which must follow the rules and mandates.

My dissertation's findings provide insight into rural principals' enabling leadership, allowing other formal and informal school leaders a way to create possible solutions to other

unique needs in their schools. This is what happened in my research of two rural South Carolina high school principals and other leaders regarding providing more OTL in advanced subjects. This leadership emerges from the necessity to create solutions for rural schools, where creativity is needed to offer the various courses and other non-instructional services offered by larger suburban and urban districts.

In this study, I examined rural school principals in South Carolina that offer their students AP or dual enrollment courses and programs in math and science. Qualitative research is needed to investigate how the local nature of some areas has led to the local school offering more opportunities to take AP (Kolluri, 2018) and dual enrollment courses. Kolluri (2018) explained that the literature she examined overemphasizes general trends, which glazes over the richness of localized understandings. According to Kolluri (2018), “Greater emphasis on theory, causal methods, and localized understandings could either suggest or deny the potential for a more equitable AP landscape" (p. 703). My focus on CLT, the how, and the context of each rural principal in their school and community met what Kolluri calls for in this statement. My research goal was to highlight how two rural South Carolina high school principals and district leaders recognized by the principals used the tenets of CLT to overcome obstacles to offer advanced math and science courses in selected South Carolina rural high schools.

**Key Words**

*Advanced Placement* (AP)- The College Board’s Advanced Placement (AP) Program allows high school students to take college-level courses (Klopfenstein, 2004). The school must meet specific criteria to receive an AP designation for their course. Each school must have an AP coordinator to handle the logistics of offering these courses (Gagnon & Mattingly, 2016).

*Complexity leadership theory* (CLT)- "is the study of the interactive dynamics of complex systems (CAS) embedded within contexts of larger organizing systems" (Uhl-Bien & Marion, p. 632).

*Dual enrollment*- enables high school students to take a course or courses through local colleges and earn college credit if successful (Gagnon & Mattingly, 2016). The syllabi and credit criteria are set by a cooperating college or university.

*International Baccalaureate*- a program for high schools where students can earn a certificate for passing the IB exam, similar to AP, or they can earn an IB diploma if they complete a set of IB courses of study (Theokas & Saaris, 2013).

*Minimally adequate*- a term used in the South Carolina Supreme Court decision *Abbeville County School District v. State,* where the Court determined that the state only needed to provide for a minimally adequate education (Abbeville County School District v. State, 1999).

*Opportunities to learn* (OTL)- the opportunity to take a dual enrollment course or program of study at a student's high school, another high school, through distance learning, or a college campus. Opportunities to learn in my study also are AP/IB courses and program of study offered through a student's high school.

*Rural*- three sub-designations: rural fringe, rural distant, and rural, remote (NCES, 2023). A rural fringe is a rural area that is no more than two and a half miles from an urban cluster (NCES, 2023). Rural distant areas are more than five miles and less than twenty-five miles from an urbanized area but also can be rural territories more than two and a half miles but less than 10 miles from an urban cluster (NCES, 2023). Rural remote is more

than 25 miles from an urban area and more than 10 miles from an urban cluster (NCES, 2023).

*STEM*- refers to the academic subjects of science, technology, engineering, and math.

**Frameworks Summary**

In this study, I employed complexity leadership theory (CLT) (Marion & Gonzales, 2014) to explain how two rural principals and two other district leaders offered their students OTL in advanced math and science courses. CLT grew from its basic form, complexity theory, "a theory of moderately restricted interactive systems, which describe most human behavior" (Marion & Gonzales, 2014, p. 231). This theory explains how companies and groups form and why some survive and some fail (Marion & Gonzales, 2014).

I applied Marion and Gonzales's (2014) theory of CLT to rural South Carolina high school principal leadership. Rural schools are complex adaptive systems (CAS) where adaptive solutions form and are ideal for studying complexity leadership in education (Marion & Gonzales, 2014). Therefore, I used CLT to understand how the selected rural school leaders overcame the typical lack of rural OTL in advanced math and science. A rural school leader who has found a way to provide OTL advanced math and science for their students has recognized and implemented a solution out of the ordinary. Providing these opportunities to more rural students will result in profound academic preparation for graduating students before entry into college and careers (Goldman, 2019). Rural school principals using CLT for solution creation provide structure while allowing for needed change. According to Marion and Gonzales (2014), "Complexity is about tension, or interdependent interaction, between order (bureaucracy, administrative leadership) and disorder (adaptive leadership)" (p. 24). I discuss CLT and my framework in detail in Chapter 2.

## Research Design Summary

For this study, I employed a qualitative exploratory multiple-site case study methodology. The data for analysis came from a semi-structured interview with principals of small rural high schools in South Carolina. The case study aided in searching for a pattern in the data focusing on principal leadership in the context of rural schools, the complex nature of each rural high school, and finding unique solutions to a common problem in these areas (Glesne, 2016). The sites in this study are small, rural high schools in South Carolina.

The case study design contributes well to examining contemporary events without manipulating behaviors (Yin, 2009). With information from this case study, principals in rural South Carolina schools will have available data and information to review. Some of this information can give insight to other principals who may see applications to their specific situation and school. Case studies inform policymakers, professionals in the field, and the public (Borman et al., 2006; Yin, 2009). The exploratory multiple-site case study method used in my research provides qualitative data on how rural school leadership increased OTL at selected sites. I discuss my data collection and analysis methods in depth in Chapter 3.

## Delimitations

Among all South Carolina rural schools, very few can narrow the OTL advanced math and science gap for their students. The leaders of these rural schools are critical to this study. However, there is very little research on these rural leaders, so my study is needed. My case study consisted of two rural South Carolina public schools offering their students advanced math and science courses and programs. I interviewed administrators, other school leaders, and stakeholders from the selected sites to determine what made it possible for their schools to offer their students advanced courses.

## Limitations

This study had limitations due to its scope. I could not interview or analyze in-depth data from most rural South Carolina high school sites for this study. I acknowledge that multiple sites can allow for limited generalizability of the findings (Borman et al., 2015; Creswell, 2009). I acknowledge that all rural sites are different, and the goal was not to provide a pattern for all rural schools to follow. Policymakers make mistakes when creating one-size-fits-all policies for rural education and rural areas (Biddle et al., 2019; Johnson & Howley, 2015; Lavalley, 2018). Nevertheless, some rural schools may use parts of this study to help solve their unique issues in providing OTL for their students.

The study data was collected in a single semester, limiting the findings as they may be affected by events or special funding impacting advanced math and science course offerings to rural students. Some specific variables could arise in a single semester of school that could affect the study. This limitation is offset by interviewing select rural South Carolina high school principals, other school leaders, and stakeholders as designated by the interviewed rural school principals when they were available.

My research did not offer a generalizable study to replicate in the diverse and varied locales that constitute rural America; this is not the job of the qualitative researcher (Glesne, 2015). It is the nature of many educators to try and replicate what does work in other schools. Understanding this nature, parts of my study may provide the needed insight to some principals of small rural schools seeking methods for increasing opportunities to learn advanced math and science.

**Significance**

The advanced academic opportunities for students in these communities must improve to reach students' potential within rural South Carolina. Half of the students in these rural schools are minoritized populations, with 68% qualifying for free and reduced-price meals (Showalter et al., 2017). With more educational opportunities and experiences, some students may break the bonds of persistent poverty (Crandall, 2015) and concentrated poverty in specific areas (SC Education Oversight Committee, 2019). With advanced coursework, rural students, like their contemporaries in non-rural districts, can change their education trajectory in high school and into post-secondary education (Irvin et al., 2016). By studying how some rural school principals can improve the opportunities for rural students to learn, my study will increase the knowledge base on this topic. More opportunities to learn will result in more equity among all South Carolina public education students.

# CHAPTER 2

# LITERATURE REVIEW

In this chapter, I synthesized the literature related to the role of rural high school leaders. My literature review includes four sections. These four sections provide the basis for answering the following research question: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses?

In the first section of the literature review, I explained the theory on which the theoretical framework of my study is based: complexity leadership theory (CLT) (Uhl-Bien et al., 2007). In this section, I gave a brief background on CLT's foundations, which arose from complexity science. I then explained the interactions of the three key leadership components of CLT. To conclude the first section of this review, I related my view of how this theory works in education, specifically in school leadership. This theory is the lens through which I analyzed the research in this literature review.

In section two, I explained how CLT is relevant to my study of rural school leadership. I propose how CLT's administrative, adaptive, and enabling functions apply to leadership in rural schools. I then examined research on rural school leadership and these leaders' roles in their rural communities. In this section, I also explain how rural leaders navigate the context and complexities of the rural community. Finally, I described how this navigation relates to the rural school leader's role in acquiring advanced OTL for their students or continuing these programs.

In section three, I analyzed the challenges for rural high school leaders to address while providing more equitable advanced OTL. This section examines statistical data on advanced-level courses provided to South Carolina students based on location. I review some challenges for rural school leaders, including community economic resources, staffing challenges, and

teacher turnover. This section is a brief history of early public education in South Carolina. This review establishes the groundwork that the collective history of inequity in public education has laid for accepting the current inequity.

In section four, I reviewed rural school leaders' challenges to overcome or mitigate in providing OTL in rural high schools. I looked at OTL's advanced math and science benefits for rural students. I also addressed how rural school leaders' community involvement, school enrollment, location, and community poverty can influence rural high schools. To complete section four, I note how some South Carolina leaders can provide advanced OTL for their students.

## Complexity Leadership Theory

Complexity leadership theory (CLT) is the basis of my theoretical framework in this study. In this section, I define CLT and explain its need in rural education. I lay the foundation for its application in educational networks. In concluding this section, I detail my theoretical construct of how CLT applies to rural high school leaders' work in South Carolina.

CLT originated from sensemaking, collectivism, and complexity science. Complexity science was an emerging and developing concept often studied around the turn of the century by many noted scholars (Cilliers, 2002; Lichtenstein et al., 2006; Marion et al., 2007; Marion & Uhl-Bien, 2001; Regine & Levin, 2000). These researchers developed many concepts through their work with complexity science that led to the development of CLT, which is where my theoretical construct begins.

### *Complexity Science Was Not Big Enough*

The book *Leadership in Complex Organizations* (Marion & Uhl-Bien, 2001) states that complexity science reduces leadership to a few observations and simple analyses to ascertain a prescription for success. However, as stated by these same researchers and by Snowden and

Boone (2007), Regine and Lewin (2000), Uhl-Bien, Marion, and McKelvey (2007), complex systems and networks cannot be predicted due to the constant interactions and tensions among agents or individuals in the system. These complex systems, known as complex adaptive systems (CAS), apply to ideas in leadership, complexity, and the systems under leadership. According to Marion (1999, p. 6), "CAS is composed of a diversity of agents that interact with each other, mutually affect each other, and in so doing generate novel behavior for the system as a whole." These systems evolve, and the agents change within the systems. The complex system is more significant than its parts, agents, and networks (Marion, 1999). A CAS's synergy of inputs and tension of ideas produces new possible solutions.

### *Complexity Science to Complexity Leadership*

The evolution from complexity science to CLT includes the view that agents (individuals) interact with each other and their systems, networks, or organizations in complex ways (Uhl-Bien & Marion, 2009). Regine and Lewin (2000) found that the rapid changes occurring in the post-modern world render traditional leadership practices and models inadequate to deal with the ever-evolving realities that are now in play. Such changes are quickly advancing technology, including the rapid change in human knowledge, access to information, and how we educate each other.

Complexity leadership theory (CLT) was born in the wake of the need to understand how leadership works in complex environments. Noted researchers in this field (Uhl-Bien & Marion, 2009; Lichtenstein et al., 2006) made the case that CLT is not a traditional top-down or hero-led leadership style. According to CLT, change is organic, occurs in context, and is endogenous (Lichtenstein et al., 2006). CLT views leadership power as distributed to persons or groups in a network, and the focus is on the work produced by the system (Marion & Gonzales, 2014) or the collectivist actions of the group (Lichtenstein et al., 2006). These complex systems evolve due to

emerging concepts and ideas, and how those ideas are incorporated into an established network sums up the CLT process.

### *Administrative and Adaptive Functions*

CLT divides leadership into three functions or parts: administrative, adaptive, and enabling (Uhl-Bien, Marion & McKelvey, 2007; Uhl-Bien & Marion, 2009), with the administrative function at one end of this continuum. Administrative leadership is the traditional, coordinating, and standardizing approach to leadership intended to exploit resources while wanting to ensure stability (Marion & Gonzales, 2014). Exploiting resources in an educational setting could mean increasing graduation rates, increasing participation in a program, or developing and sustaining AP and dual enrollment programs.

On the opposite end of the CLT leadership continuum is adaptive leadership, which relates to change and influence. The adaptive function is not what a person does but what the collective group or an individual does, creating an idea or solution to a problem (Marion & Gonzales, 2014). These researchers further make the case that adaptive leadership is best used in complex environments when seeking information while exploring solutions to problems and environmental challenges of the network or organization (Marion & Gonzales, 2014). In the context of my research in rural education, challenges to overcome could be poverty, low academic achievement, the desire of the community for students to have more rigorous course availability or not, teacher retention and recruitment, and how the community and school leaders provide more educational opportunities for their students. The adaptive leadership function typically manifests in collectives and groups, and Lichtenstein et al. (2006) noted that it "presents an alternative conceptual framework, based in relationships, complex interactions, and influences that occur in the 'space between' individuals" (p. 9). These researchers referred to the

work between groups and committees as occurring in an enabled environment that a willing administrator must create.

### *Enabling Function*

The development of CLT continues to evolve. Scholars in their work on shifting leadership from the industrial age to modern times (Uhl-Bien, Marion, & McKelvey, 2007), and in their work on educational leadership (Marion and Gonzales, 2014), and educational organizations (Uhl-Bien & Marion, 2009) recognized that for an organization to continue to evolve, there had to be recognition of the third function of CLT, the enabling function. These scholars realized that in bureaucratic organizations such as education (Uhl-Bien & Marion, 2009), the two extremes of the administrative and adaptive functions would not work together or efficiently without recognizing the third piece of CLT, the enabling leadership function.

The enabling function balances the administrative and adaptive functions so that the adaptive function can create solutions or attempt new ideas. The administrative function ensures that the main system is running efficiently. It also involves ensuring that regulations are being followed and documented before endorsing or implementing a change in the system. As Marion and Gonzales (2014) stated, “Enabling leadership fosters conditions that enable adaptive behaviors and foster an effective balance between administrative and adaptive leadership” (p. 246).

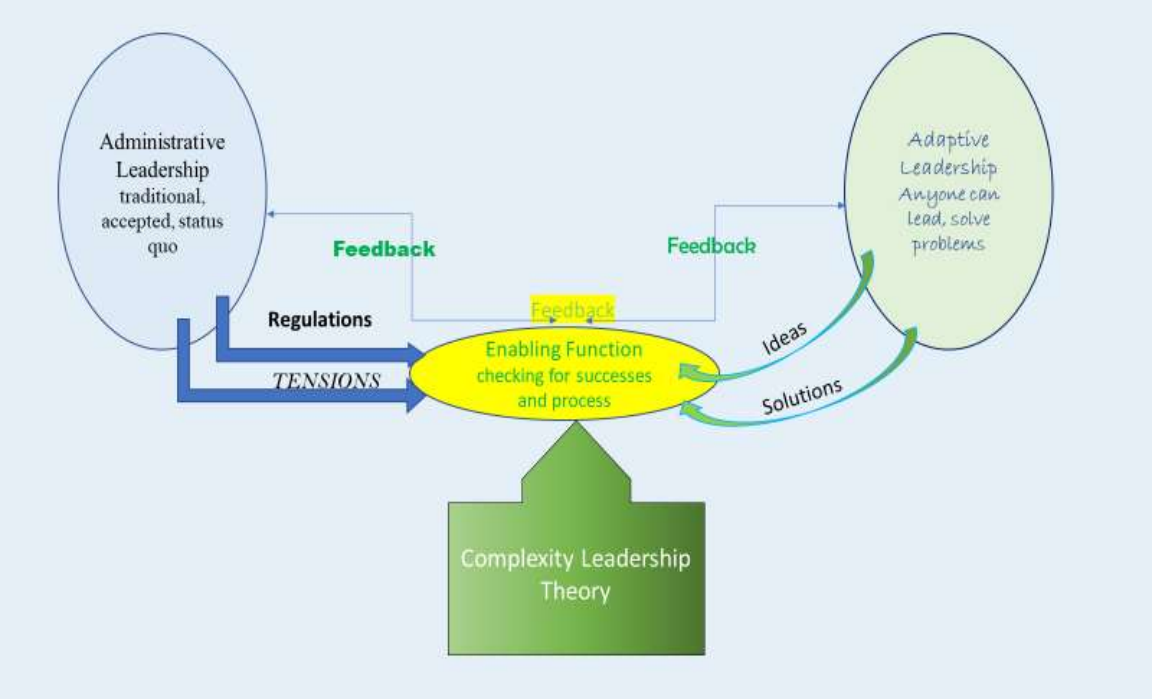


***Figure 2.1 Complexity Leadership Theory Balance***

As shown in Figure 2.1, the enabling function balances the structure and control of the administrative function and the creativity of the adaptive function (Marion & Gonzales, 2014). When a problem presents itself, the enabling leaders shift responsibility from the administrative leadership function to the adaptive leadership function to find solutions. As ideas and solutions emerge, the enabling leadership function either suppresses or champions proposed solutions and interacts with the administrative function to arrive at an acceptable solution (Marion & Gonzales, 2014). In other words, enabling leadership insulates the creative adaptive function from the administrative function so that ideas and solutions continue to flow. Likewise, the enabling function insulates the administrative function from runaway thoughts or ideas that would fall outside the system's parameters that the administrative function must follow.

The administrative function constrains solutions due to regulations, policy, tradition, and personal beliefs. Persons in administrative leadership desire compliance with structure, stability, and the status quo (Uhl-Bien & Marion, 2009). The adaptive function, or CAS, produces ideas

and solutions. The enabling function is the negotiator, the balance (see Figure 2.4) that resolves differences between the two ends of the CLT spectrum (Marion & Gonzales, 2014). These three parts are complex; however, leaders may cross back and forth from one function to another, as these parts are entangled and have "fuzzy boundaries" (Uhl-Bien & Marion, 2009, p. 633). There is no firm line and drawn boundaries among the CLT components.

From Regine's and Lewin's (2001) perspective, "Both guidance (administrative function) and open-endedness (adaptive function) are needed to lead complex adaptive systems. It is not enough to sit back and let things unfold; the system enters chaos at that point" (p. 20). Regine and Lewin (2001) gave several examples of CEOs who forced their organizations into chaos so a change would occur. This method was adopted due to constraints beyond their control as CEOs (Regine & Lewin, 2001). These people had to move ideas from the adaptation stage to complete tasks and meet the demands of the shareholders and owners for production. These demands were the parameters that helped the leaders focus the CAS on a task. This business scenario involved adults, not school staff and school-age children. However, this example relates to school leadership as school leaders often have mandates that apply to all schools regardless of where the school is located and regardless of the demographical composition of the school. The school leaders navigate compliance with these official mandates and must satisfy local expectations.

**CLT in Education**

In an educational setting, each function of CLT may not be interchangeable, but agents with formal roles in each leadership function may serve purposes in between functions. Instead of three impermeable forms, CLT in education is like a Venn diagram in which the three functions intersect and interact with each other to find solutions to questions and issues as needed. Marion and Gonzales (2014) explained that some confuse complexity with complication.

To explain this, the researchers stated that a jet airliner is complicated, with its tens of thousands of intricate parts. However, someone with certain skill sets could break the jet down into its parts again. The parts have not changed because of their assemblage into a jet airliner. They are complicated, yes, but not complex. Complex systems do not equate to complicated.

The difference between complicated systems like the jetliner and a complex system is the changes and adaptations occurring within a complex system. Cilliers (2002) explained complexity in this way: humans have brains, and the brain is complex, with its neurons reacting and changing due to the information it receives. The neurons interact, and the brain learns from experience and environmental interaction (Marion & Gonzales, 2014). New ideas emerge from these interactions. That is complexity, and in complex systems or networks, change is due to interaction among its parts or agents who are ever-changing due to these experiences (Regine & Lewin, 2000). Humans and our adaptation to the information or interaction we encounter moment by moment are part of complex networks.

Complex networks or systems change because network agents interact or work with the environment or context surrounding it. Like the human brain, complex systems learn and adapt or evolve in response to the interactions of agents within the system but also due to interactions with other similar systems (Cilliers, 2002; Marion & Gonzales, 2014; Uhl-Bien & Marion, 2009). The result of interactions or a changing environment inside or outside the organization or network causes adaptation or evolution. Snowden and Boone (2007) made the case that complex systems are not linear in decision-making or logical due to the unpredictability of human nature. Once change happens in the system, the adaptations and evolution of a complex system are irreversible (Snowden & Boone, 2007). Even if the change was unsuccessful, the complex

system does not ignore the information it learned. Nevertheless, another adaptation or adjustment may occur that is more successful.

### *School Leadership*

This theory does not have to eliminate a traditional individual leader or a leadership team from where some people assume directives and solutions to problems in an organization flow (Lichtenstein et al., 2006; Regine & Lewin, 2000; Uhl-Bien & Marion, 2009). In educational systems, the application of CLT is less of a homogenizer. The leader does not disappear, but influential school leaders, as Snowden and Boone (2007) stated, braid themselves or, using their Welsh term, cynefin themselves into the community and their school. This process is a melting of the leader and school into each other. The school leader needs to understand the school's context and the adaptive process to enable the system so ideas can emerge (Uhl-Bien & Marion, 2009). In CLT, pressure to innovate and create solutions for problems is removed from the singular voice of the formal leader (Lichtenstein et al., 2006).

My family's shrimp creole recipe is a better example of how CLT in rural education looks and feels. The ingredients are a variety of spices, vegetables, and meat. Each ingredient goes into a large warm pot at the proper time. Each vegetable, spice, and meat has its characteristics, consistency, and flavor, and each brings these to the pot. The space in the pot represents a complex adaptive system (CAS). The pot is the administrative function placing constraints and boundaries on the CAS (Regine & Lewin, 2000). These ingredients bounce off each other by adding heat or tension to the pot. This mixture soon becomes an entangled flavor. The spices have blended into the mixture. The vegetables have become somewhat translucent but still recognizable. They retain their identity, but make no mistake; a change has occurred. The overall flavor is not of singular ingredients but a solution that combines throughout the process. Altogether, the creation is a catalyzed version of its parts, creating something new and more

appealing than before (Marion & Uhl-Bien, 2001). The product of the process is a new creation, something greater than its parts.

Rural schools are similar to shrimp creole. Constraints in education exist in the state, local policy, and in the context of the school and community. These constraints are like the pot where the ingredients cook and mix. The relationships between the community and school are the spices in this complex environment. The community typically intertwines with the school in rural settings. Opinions, traditions, and beliefs draw various percentages of community members close or push them away from the local rural school (Rimm-Kaufman, 2018). Rural schools typically reflect the community (Klar & Huggins, 2020). It brings its flavors, characteristics, and community, but the ingredients retain their original features, like the rural school in its context.

Like cooking a classic meal, working with staff and the community is an organic existence (Regine & Lewin, 2000) in rural education leadership. A rural school leader who is in tune with their community's needs and desires is influential. For the CLT-aware rural school leader, meeting the needs of the school and community develops trust in a complex environment where solutions and ideas are not only welcomed but encouraged (Rimm-Kaufman, 2018).

**CLT and Rural School Leadership**

CLT research helps explain how some rural schools and communities have shown an adaptive ability (Marion & Gonzales, 2014; Uhl-Bien, 2007) to create innovative solutions. Previous research has not applied CLT to rural school leadership. My study addresses how CLT applies to rural school leadership. Uhl-Bien & Marion (2009) refined CLT for use in bureaucratic systems, including education and other networks. My focus is rural school leadership and CLT. Small rural schools are complex systems, and CLT is useful for further study of these schools.

### *Administrative Function in Rural Education*

The administrative function handles what some would consider the formal rules, regulations, governmental mandates, and community beliefs or de facto mandates. As depicted in Figure 2.1, CLT is a balanced scale. This figure also illustrates the system's constraints and boundaries or what the researchers denote as tension: formal processes, rules, and regulations (Marion & Gonzales, 2014; Uhl-Bien & Arena, 2018). These are the formal processes of the educational system. Rural schools are not immune to universal constraints from the state or other governmental bodies and community expectations. These constraints help form the education system's focus so that it will not give way to chaos, which could negatively affect student learning.

Administrative leadership practices suppress creation with rules and mandates. School district superintendents and principals are formally recognized leaders. These positions have a place in the administrative function of CLT. Mandated ideas thrive in traditional administrative leadership practice; they are stable, accepted (Marion & Gonzales, 2014), and seek stasis (Regine & Lewin, 2000). Mandates and rigid functions in administrative leadership can result in undesired consequences if not counterbalanced by an adaptive and enabling leadership function as in CLT. An example comes from studies conducted in Michigan and Arkansas. These states require AP for all students, and this mandate does more harm to underperforming students than good (Arce-Trigatti, 2018; Jacob et al., 2017). These studies found that students who were not prepared to take on such work or were not supported in taking on such work had lower success rates and college readiness rates than their peers who studied in schools where this type of coursework was not required.

Mandates fit some political leaders, district superintendents, and school principals' desires because they allow for the efficient administration of tasks required of schools and

districts. However, blanket mandates can lack local adaptability (Arce-Trigatti, 2018; Jacob et al., 2017; Tieken, 2017). Mandates are examples of top-down management (Tieken, 2017). The intent of a mandate, such as requiring AP courses for every student in a state (Arce-Trigatti, 2018; Jacob et al., 2017), may not have been intended to harm. However, these mandates can miss their goals without adapting to the local school and community context, usually alienating the communities these mandates were supposed to help (Tieken, 2017). CLT is a bottom-up solution generator whose core goal is adaptability, so localized solutions may be created for each rural school when mandates appear. In this study, I hypothesized that rural school leaders with enabled place-conscious thought and a CLT mindset could harvest solutions and ideas to help their rural schools.

### *Adaptive Function in Rural Education*

The adaptive function of CLT is applied to education when teachers, administrators, and possibly other staff create and vet solutions to overcome a problem (Marion, 1999; Marion & Gonzales, 2014). These agents at the forefront can navigate solutions to implementation issues from a mandate, such as required courses. In education, some control through constraint is necessary. The adaptive function, unrestrained, borders and intermixes chaos and disorder (Marion & Gonzales, 2014), but in education, there are restraints due to the needed flow of education for the sake of the children involved. The administrative function in education comes from the law and policy governance structure. Local boards in South Carolina implement these policies through the district superintendent. The superintendent enacts these policies through school leaders and other supervisory staff. In CLT, the administrative function constrains the adaptive function (Marion, 1999). Still, in education, I propose that the administrative function can focus on the adaptive function by providing scaffolding, parameters, or constraints that help avoid disorder.

### *Enabling Function in Rural Education*

As shown previously, the enabling leadership process is like a balance scale between administrative and adaptive leadership. The enabling function is the balance that weighs community expectations of a school, which Klar and Huggins (2020) described in their work, along with laws and other educational mandates. Through the enabling function, administrators and teacher-leader teams meet formally or informally. This process is the crucible where refining ideas and what works in rural community A is tried and found acceptable in rural community B.

The enabling function of complexity leadership can also check solutions from the adaptive leadership side of the spectrum while offering the administrative structure of a system to constrain the chaotic adaptation process (Uhl-Bien & Marion, 2009). CLT allows persons enough freedom to try solutions to problems common to others in similar environments (Marion & Gonzales, 2014). Thus, CLT helped answer the research question for this study: How do rural South Carolina high school leaders provide students opportunities to learn in AP or dual enrollment math and science courses?

A rural school principal or small district superintendent can be the catalysts that enable an idea or adaptive process so unthought-of ideas and changes may occur. These changes are not the result of a hero leader but of a community of leaders interacting in ways that produce new innovative solutions (Marion et al., 2016). Marion and Uhl-Bien (2001) stated that a CLT leader tends to the organization or environment so that innovation can occur. While the formal leader may not have the solution, they can provide the means for ideas to form that may catalyze their organization and other similar groups (Snowden & Boone, 2007; Lichtenstein et al., 2016). Administrative leadership can allow for the creation of committees and groups. Still, in education, the enabling function of CLT can efficiently allow freedom to adapt solutions to

problems in the organization. In my research, the organizations were small rural South Carolina high schools.

Figure 2.2 presents CLT as a Venn diagram displaying the leadership areas on either side and the enabling function in the middle. An example of what these three functions are responsible for is included. The Venn diagram was chosen to illustrate that the functions intersect and overlap.

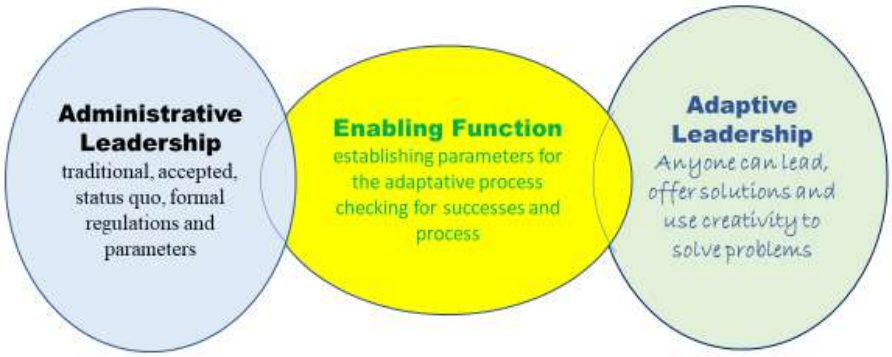


***Figure 2.2 Complexity Leadership Theory***

A rural high school principal serves many roles, so it is also fitting that this individual should serve as a vital piece of the enabling leadership function in rural schools. The principal must navigate the complexities of leading while being aware of the context of a rural community and school (Klar & Huggins, 2020; Sutherland et al., 2022). This leader may find themselves in a position to enable others in the educational process to find solutions through complex leadership and to solve problems they encounter in delivering quality education to their students.

The rural school leaders in the administrative, enabling, and adaptive leadership interface can find ways to provide opportunities to learn in various subjects like advanced courses such as math and science in rural high schools. This leadership theory can, I hypothesized in this study, lead to solutions to creating a more profound academic preparation for rural students before entering college and careers (Goldman, 2019). CLT provides structure while allowing for needed

change. Marion & Gonzales (2014) stated, “Complexity is about tension, or interdependent interaction, between order (bureaucracy, administrative leadership) and disorder (adaptive leadership)” (p. 247). CLT seeks solutions outside traditional command and control processes in bureaucratic systems such as public education.

**Rural Attachment to Place**

According to NCES (2023), rural communities are near or far from population-dense places such as suburbs and urban areas. Some rural residents have attachments to the place of their native rurality. Snowden and Boone (2007) referred to this connection in the Welsh term “cynefin” or the “braiding together” of a person with the place of their upbringing. Other researchers suggested that some rural stakeholders want to mix place, tradition, local knowledge, and quality education (Budge, 2006). In a theoretical piece, Azano and Biddle (2019) shared that tying local resources, histories, and social context to education may help some rural students connect their place to the world at large.

In some rural areas, school principals and superintendents distinguish between community members’ educational desires and accepted standard curriculums like Common Core State Standards. Battles can flare up in struggles over generic curriculums delivering the same subject matter regardless of location instead of a place-based or place-inclusive curriculum teaching similar concepts but relating it to the student’s community. (Biddle & Azano, 2019). Researchers Azano et al. (2017) and Budge (2006; 2010) defined place as the context of a community, including traditional careers in the area, history, socio-economics, demographics, and lifestyle. Biddle and Azano (2016) recognized place as the interpersonal relationships and connections to a specific location. Quality relationships can foster a positive difference in some

rural locations, and this makes it possible for rural leaders to connect and possibly have open lines of communication with the community.

Researchers Preston and Barnes (2017) also emphasized that "The close connection between a rural school and its community necessitates a kind of place leadership" (p. 6). An effective rural principal or even the rural superintendent can use their role as a leader to connect with the community to help create and move the rural school's vision to align with the needs of students and the community they serve. Residents in some rural places want homage paid to what makes their community unique and may also want their students to have more opportunities.

**Rural School Leaders Influencing Change**

Being in a rural area and being a school administrator has challenges. When change or continued support for the mission of the schools in rural areas is needed, school leaders may use social collateral or capital, provided they have built any, to help bring together community members for needed support (Sutherland et al., 2022). In their book on developing rural school leaders, Klar and Huggins (2020) noted that the rural school is within the community and its interdependent contexts of politics, demographics, economics, and sociocultural issues. The researchers further stated the importance of leading in the context of a community.

> "Key findings…highlight the role of school and district leaders in proactively influencing the contexts in which they lead. Being able to lead in such contextually relevant ways requires a high level of contextual literacy or familiarity with the contextual factors that influence leadership practices" (Klar and Huggins, 2020, p. 8,).

Due to the more hands-on nature of a small rural superintendent living in and being a part of the community they serve, a rural school principal or rural district superintendent is often the person

in charge of the largest rural community employer (Budge, 2006). These roles and positions can place these leaders in a significant role as community and educational leaders. In a small qualitative study of two rural superintendents, Rey (2014) found that rural citizens are not opposed to a superintendent's new ideas. However, Rimm-Kaufman (2018) suggested that buy-in must come from the community and school leaders to make possible changes by a superintendent, principals, or other school leaders.

Some leaders use relationships and informal moments to speak to community members at a store while shopping, on the street, at church, or at public events; these are places where leaders can move public thought (Biddle & Azano, 2019). Sutherland et al. (2022) recognized that a rural community principal who can interact with the community and understand what is needed by the community and its students may be a change agent. In this scenario, leaders operating in an enabled system charged with positive relationships may be able to change the way things have always been here. This is a euphemism in some rural areas for the reluctance to change a system idea well past the time for a change. Effective leadership is crucial to breaking the bonds of repression and closed social groups, possibly leading to understanding among all groups forming the community (Sutherland et al., 2022). Effective rural leaders understand and use the dynamics of a community to become catalysts for necessary change and growth in their rural schools.

Rural principals and other school leaders have unique leadership positions. These leaders serve dual roles that can increase opportunities for rural students. In a study of partnerships among public schools and community-based foundations in two Appalachian areas with high poverty rates, Rimm-Kaufman et al. (2018) recognized that certain partnerships, non-governmental foundations, and small agencies have successfully collaborated to create inclusive

change. The research in this study found that the foundations and nearby university involvement began with gaining the opinions of the community and school staff on what would make a meaningful difference in the community's schools (Rimm-Kaufman et al., 2018). The principals in this study suggested that change required community buy-in (Rimm-Kaufman et al., 2018). Rimm-Kaufman et al. (2018) asserted that change is not a top-down or bottom-up solution but must come from both directions. The space between top-down and bottom-up solutions is where the rural school principal and other rural school leaders fit.

Rural school leaders' ideas on change benefit from their formal and informal authority; thus, they possess the ability to help create positive change as these areas become more inclusive in thoughts and ideas (Bauch, 2001; Budge, 2006; Budge, 2010; Rimm-Kaufman, 2018). The rural school principal can also personally impact the community, attracting newcomers for work, good schools, or lifestyle while political, cultural, and economic situations shift (Klar & Huggins, 2020; McHenry-Sorber et al., 2021); these leaders offer acceptance-building trust and social capital.

Rural school leaders' roles extend beyond the schoolhouse door (Azano & Biddle, 2019). These roles are present when a small-town mayor reaches out to the school principal or district superintendent to discuss an issue and how it will affect each party in a rural community. When a rural superintendent, principal, or other school leader speaks with an influential citizen in the store or buys vegetables or livestock from local farmers, they extend past their official role. In a comparative case study, Rey (2014) suggested that community connections build relationships and trust in the school leaders in a rural community, even with the complexity of a rural school where tension can exist between local and formal knowledge. This connection or belonging to place (Budge, 2010) is as unique as the communities and people living there.

New administrators unfamiliar with rural life can find this tie to the people and place difficult (Bailey, 2020; McHenry-Sorber, 2021; Rey, 2014). Moffa and McHenry-Sorber (2018) found in their qualitative study of the university experience of rural-identified persons that place matters to many rural people and that rural communities interconnect with the land and resources. Just as roles can extend outward from the school in rural settings, the place can extend into the school. These mixings of localized thought, standardized curriculums beyond local leaders' control, and the passion for the place are what Azano and Biddle (2019) cautioned is not a dichotomous solution or binary choice to stay or leave a rural community (Gruenewald, 2003). Having more OTL for students in a rural community can expand students' options.

The decision process to offer OTL advanced courses in rural areas is not a dichotomous choice either. In finding a way to offer advanced OTL to their students, rural school leaders must weigh the use of their social capital and their ability to connect to the area, ensuring they honor the place as they bring in more educational opportunities (Sutherland et al., 2022). Effective leadership is needed to balance the community needs, student needs, and the potential impact of change in the school.

Some rural schools fit in the metaphorical center of a rural community, and the community can be reflected directly in the local school. Its place in the community context is as unique as each rural community. Klar and Huggins (2020) identified four areas of context that play a role in influencing the community and the school. These areas are a community's political, economic, demographic, and sociocultural contexts. The history of a rural area can influence how these spheres interact, what succeeds, and what restraints are present regarding local education (Klar & Huggins, 2020; McHenry-Sorber & Schafft, 2015). These spheres and the historical context interact and influence each other in a complex environment (Marion &

Gonzales, 2014), allowing for categorical observations of place in rural communities. In this study, I used these context categories and area traditions to understand better how rural high school leaders can affect complex environments like rural areas.

Given the opportunity to implement solutions for their students needing advanced opportunities to learn or to continue a program offering OTL, a rural school leader in tune with and engaged in the community has the power to change a system for the better. School leaders in some rural South Carolina areas have used their knowledge of their communities' political, economic, sociocultural, and demographic contexts to provide a more equitable education for their students (Klar & Huggins, 2020). My study revealed some of these solutions to be replicated or researched in more depth.

### *Community Economic Resources*

Fewer community economic opportunities can lead to households with less income. Poverty plays a critical role in what schools can provide to their students. The area's poverty level affects the school system's ability to provide OTL from advanced courses, including math and science. Nationally, a suburban school with an average poverty level is six times as likely as a rural, impoverished school to offer advanced OTL to students, even when low enrollment is controlled for (Gagnon & Mattingly, 2016). This factor reduces the argument that economies of scale alone, which come from consolidations in some areas, can solve the lack of OTL in rural areas, which is a basis for some rural school and district consolidation arguments.

In many rural areas, a community's economic resources influence education funding and other services. The more students in poverty or receiving free and reduced-price meals in a school, the more funding South Carolina schools receive per student. However, if a school is in an impoverished area, the tax revenue to run local schools will also be low, thus reducing what

leaders in these schools can offer their students (Kolluri, 2018; Tieken & Auldridge-Reveles, 2019; Tran & Smith, 2021).

Long-term poverty is persistent poverty that has existed in an area for 20 years or more (Krandall, 2015; Shaefer et al., 2016). According to the USDA Economic Research Service (Farrigan, 2017), 85.3% of counties in persistent poverty are rural. Poverty is also a typical Southern problem; 84% of the impoverished counties are in the southern United States (Farrigan, 2017). Poverty grips the lives of those growing up in this cycle, and the education system may also suffer. The educational system in rural areas can uphold a continuation of past events and negative outcomes, or it can be part of the solution. More opportunities in rural schools provide hope. I hypothesize that effective leadership of South Carolina's rural high schools can, and in some areas already has, overcome the potentially negative impact on rural schools with low enrollment and a higher rate of economic need. These leaders have turned what some see as challenges into opportunities, possibly tapping into rural grit to overcome obstacles.

### *Rural South Carolina Students*

Rural students in South Carolina are more impoverished than many in America (Showalter et al., 2019), but poverty is only part of the South Carolina story. South Carolina public schools educate 224,007 students (NCES, 2021). Poverty is a factor in many areas of South Carolina, with 20% of the state's total student population living in poverty (NCES, 2017). Rural South Carolina students fall in the mid-high poverty classification (NCES, 2017). These same schools have a high minority population, and most rural students attend a small-population high school (Showalter et al., 2019; US Census Bureau, 2019). South Carolina's rural student population meets criteria that put these students in areas less likely to offer advanced math and science courses (Gagnon & Mattingly, 2015). These statistics lay a foundation for a needed change in expectations in rural South Carolina. Rural, minority, and possibly impoverished

students should have similar opportunities as their age group peers who may be in opposite categories.

Some research points to findings that suggest rural students, as in South Carolina's rural schools, may fall short of their potential without advanced course offerings. Setting higher expectations in rural areas by offering advanced math and science could elevate the academic achievement and trajectory of rural, impoverished, and minoritized populations (Koricich et al., 2018). In a comparative case study of three rural western Pennsylvania school districts, Kryst et al. (2018) found that the school is an essential factor in the future educational aspirations of rural youth. Other studies have recognized the significance of school expectations of students and the availability of advanced coursework in raising academic trajectories (Irvin et al., 2011; Irvin et al., 2016), meaning that students in these schools are more likely to pursue college work after high school. Students from marginalized populations in rural areas may have expectations of college, but they have less than the needed academic preparation (Byun et al., 2017). As the data presented earlier in this chapter illustrated, fewer students can access AP coursework in rural and town locales.

According to Irvin et al. (2011), smaller school size is related to better academic success for some marginalized students (Irvin et al., 2011). However, students from disadvantaged backgrounds are more likely to attend a school with limited ability to prepare them for college (Irvin et al., 2011). Increased advanced academic offerings may increase expectations and change rural trajectories. Among the 2,000 students involved in the study of Byun et al. (2017), 65% of the students involved in college prep coursework and informed about post-secondary options were more likely to enter a two-year college and later graduate from a four-year college.

Rural high schools in South Carolina have a graduation rate of 80.6%, but if that student is a minoritized person, the rate drops to 72% (Showalter et al., 2017). Rural or town students in South Carolina make up half of the state's students. Many of these rural and town students attend small enrollment schools. The data charts compiled by selected NCES, CRDC, and South Carolina State Department of Education data show that many students lack extensive opportunities to take advanced math and science courses. Perhaps the reasons for the two separate public education systems lie in the history of the educational system in South Carolina.

***History***

Public education in South Carolina was sparse at best early in the colony's history. Even then, there was a sentiment among wealthy landowners as to why enslaved, poor, and immigrant populations and the areas they inhabited needed a formal education system. This mentality towards public education in South Carolina can be traced throughout history into the present. South Carolina public education did not formally exist until 1710 when the Colonial Assembly passed an act to provide "common schools" to be formed near Charleston (Bartels, 1984). Noted South Carolina historian Walter Edgar (1998) wrote of education in the state's early days; the wealthy paid for private tutors or boarding schools for their children and did not want to be taxed to build common schools for the public. Several private schools were established around Charleston, where merchants and wealthy landowners' school-aged children attended (Edgar, 1998). Common schools were the first public schools in South Carolina, but these were for common people or working-class free whites (Edgar, 1998).

The historically extensive agricultural work in South Carolina hampered formal education. In the ante and postbellum periods, maintaining the status quo of landowner superiority over non-elite white labor, free men, and slave labor was more important than formal knowledge (Weissman, 2019). This statement meant that the wealthy elite would have an

education while those who worked for them only needed to be able-bodied and hard-working. The ruling class did not recognize that formal education was for lower-class people.

Educating enslaved people to enhance the owner's business was not uncommon and typically was done so they could conduct business on behalf of their owners when needed. In 1740, alarmed by the number of enslaved persons taught to read and write, the General Assembly passed the Slave Code, making it illegal to teach enslaved people (Bartels, 1984; Edgar, 1998; Weissman, 2019). However, this teaching still took place secretly and not so secretly in homes around the state (Bartels, 1984; Edgar, 1998). Education was a privilege, not a right. Education in South Carolina started unequally and slowly, except for the children of the few privileged white landowners and business merchants.

In *Plessy v. Ferguson* (1896), the Supreme Court established the legality of the separate but equal doctrine. Some areas began to have separate but unequal schools for black and white citizens because of the ruling (Bartels, 1984; Edgar, 1998). This case established the formal acceptance of segregation. In a history of South Carolina schools, Bartels (1984) stated that after the *Plessy* ruling, in the early 20th century, 85% of state schools were rural with little funding and few quality teachers. State superintendents during this time railed against the lack of adequate funding and standards for certification, teaching, and buildings (Bartels, 1984; Edgar, 1998); while the General Assembly made modest changes, it was evident that separate schools were never equal between the races nor between wealthy areas and poorer areas (Bartels, 1984; Edgar, 1998).

At the dawn of the 20th century, the state was still very rural, and many schools were one- or two-room schools within walking distance of the student's home. Progressive-era reformers felt rural schools were behind and curriculums were too tied to place (Bartels, 1984;

Biddle & Azano, 2016). Some politicians and educators at the time felt that teaching students basic skills and local trade knowledge in education was antiquated (Cubberly, 1922). According to these groups, rural education was the heart of the "rural problem," as a noted professional educator of the era, Cubberly (1922), reported to the nation. Rural education and, by proxy, rural people were called derogatory terms such as hicks and labeled as dim-witted, backward, and living in the past (Surface & Theobald, 2014). This thought has set the tone for over a century of rural life and education.

In 1990, State Superintendent of Education McMahon stated that the poor management of public schools would result in economic trouble, further saying, "each district has as poor schools as its people will tolerate—and in some districts, anything will be tolerated" (Bartels, 1984, p. 12). When segregated schools and districts in South Carolina began consolidating, the gap between black and white schools widened. Differences in physical school buildings, materials, and teacher pay left no doubt that two systems existed (Bartels, 1984; Edgar, 1998).

As white schools in rural areas were consolidated or forcibly closed, the standardization of modern education eliminated what is termed place-based education today (Tieken, 2017). Black schools were also closed and consolidated during this time. Formal education was minimal, while farm trades and working skills were emphasized to ensure an adequate rural workforce (Tieken, 2017) as rural outmigration or brain drain (Petrin et al., 2014) began earnestly. The past acceptance of this two-system model still haunts small rural schools today.

A challenge to this two-system model emerged in 1949 when Rev. J.A. Delaine helped local parents fight inequality in what became *Briggs v. Elliot* (1952; Edgar, 1998; Gona, 2012). This case was combined with the landmark case *Brown vs. the Board of Education* (1954). In *Briggs v. Elliot* (1952), Dr. Kenneth Clark performed a psychological test on a sample of the

black students directly affected by attending a segregated school in Summerton, SC (*Brown v. Board of Education*, 1954; Gona, 2012). By attending a segregated school and receiving a lower quality of education than their peers, black students in Summerton viewed themselves as less than their white peers (*Brown v. Board of Education*, 1954; Gona, 2012). Dr. Clark's test was influential in causing the US Supreme Court to rule against segregated schools and the separate but equal doctrine (Allen, 2019; *Brown v. Board of Education*, 1954). Segregation caused inequality; one group was favored over another in their education due to race. Dr. Kenneth Clark proved that black students receiving fewer resources and learning opportunities in segregated schools thought differently than their white peers (Allen, 2019; Clark & Clark, 1950). Segregation during Jim Crow produced students who did not have a separate but equal education but an inequitable education altogether. Today, inequities still exist for some students.

The modern inequity of small rural school students having less opportunity to participate in advanced math and science classes puts rural students at a disadvantage for college and career opportunities. In a study on the impact of AP expansion in Texas, Klopfenstein (2004) stated that rural students, particularly from minoritized populations, have fewer opportunities to take AP courses due to a lack of background knowledge needed for advanced courses. Likewise, Gagnon and Mattingly (2015) found in a review of state equity plans to ensure quality teachers in schools across the United States that rural high schools are most likely not to offer any AP courses if the schools are also "small, remote, and poor" (p. 278). When these students compete for college admission and scholarships with students who attended schools with more access to AP and dual enrollment math and science courses, they are less likely to have success (Goldman, 2019). As students who endured racial discrimination and inequality in the Jim Crow South, it is not improbable to think that today's students from small, rural, impoverished schools who lack the

opportunity to learn in advanced courses may think differently than their peers from more opportune situations in more populated and affluent areas.

In South Carolina today, some schools are separate but have unequal opportunities to learn. This division is not based solely on race or ethnicity. The basis for today's inequity is poverty, race, rurality, and school enrollment (Kotok, 2017; Irvin et al., 2017; Irizarry, 2021). The wording in the South Carolina Constitution refers to public education funding only needing to meet the standard of "minimally adequate." Resegregation, loss of voice, and poverty in some areas have resulted in fewer opportunities for students, as parents in these areas may not lobby for specific curricula offered in better-funded schools (Darling-Hammond, 2013; Hawes, 2018). Location, enrollment numbers, socioeconomics, history, and funding can reduce rural students' opportunities to learn advanced science and math.

**Challenges for Rural School Leaders to Overcome**

My focus is not that suburban or urban schools should have fewer advanced course offerings but that rural schools should have more advanced math and science courses. Researchers consider these courses critical indicators of high school students' college potential and a way to recognize their eventual college completion (Gagnon & Mattingly, 2016; Goldman, 2019; Irvin et al., 2017). In research studies, college students from rural communities have indicated that a lack of advanced math and science courses hindered their progress once in college due to needed remedial courses, extra time to graduate, and other necessary support systems (Byun et al., 2017; Gagnon & Mattingly, 2016; Klopfenstein, 2004). Byun et al. (2017) suggested that higher education offers support and transition aid for rural students without the level of coursework that many of their peers possess upon college entry.

### *Access*

The Education Commission of the States found that rural students are 20% less likely than those in suburban and urban districts to be offered one AP course at their high school (Mann et al., 2017). Unfortunately, the rural student's chances of access to one STEM (science, technology, engineering, and math) focused AP course are 62% compared to 93% of students in suburban schools, outpacing all urbanicity categories (Gagnon & Mattingly, 2016; Lavalley, 2018; Mann et al., 2017). Furthermore, some research indicated that low enrollment, remote, poor, rural district students have only a 14% chance of taking an AP course and may lack a nearby college offering dual enrollment programs with the high school (Gagnon & Mattingly, 2016).

### *Demographics*

The school's demographics have a role in advanced math and science course offerings. Students who attend a school with 50% or more free and reduced lunch populations are less likely to have AP/IB or dual enrollment courses offered in their high school (Darling-Hammond, 2013; Gagnon & Mattingly, 2016; Irving et al., 2017). Rural schools with average poverty levels are almost seven times less likely to offer AP or have students enrolled in AP than their suburban counterparts (Gagnon & Mattingly, 2016). Students who attend schools where most students are from a minoritized population are less likely to attend a school with an AP or dual enrollment course (Lavalley, 2018). Combining those demographics and a more rural location, the low-enrollment school will likely not offer their students AP or dual enrollment courses (Gagnon & Mattingly, 2016; Grant, 2022; Iatarola et al., 2011).

South Carolina's rural high schools, with an average demographic of 50% minority students and large rural enrollment, could cause one to draw conclusions similar to those of these national studies (Lavalley, 2018). The compounding factors of rurality, poverty, and race appear

to influence access to advanced courses. Prior research suggests that children growing up in small rural communities may have less access to advanced courses due to school poverty levels and demographics.

### *Staffing*

Teachers must have higher-level degrees or certification to teach AP or dual enrollment courses, creating staffing challenges in finding credentialed staff to offer advanced courses (Azano et al., 2014; Hornbeck & Malin, 2019; Piontek et al., 2016). Teachers with advanced certifications are often too few in rural districts and too far from other rural schools to be shared between schools (Piontek et al., 2016; Tran et al., 2018). Low enrollment also can mean fewer students are interested in a subject, and online or distance options may be the only viable choice for rural high schools. Prior research has stated that online teaching does not replace face-to-face engagement in many instances, thus limiting these options for rural students (Gagnon & Mattingly, 2016).

Students with adequate preparation for classes have greater chances of success in advanced courses later (Gagnon & Mattingly, 2016; Heinrich et al., 2019). Students from poverty and students of color are more likely to have a less qualified teacher teaching them, which is the same disadvantage that many rural students now have (Gagnon & Mattingly, 2015; Palermo, 2021). Providing excellent teachers should be a goal for all districts. Staffing issues continue to hamper the effort to offer or expand advanced math and science to small rural high schools.

### *Providing Opportunity*

Some rural schools and districts in South Carolina have turned to AP and dual enrollment courses to meet the student or public demand for advanced classes. An alternative to AP programs in rural and less populated schools is dual enrollment or early college programs that

are regionally recognized, accredited college courses for high school students through the South Carolina Technical College System (Price, 2020). In South Carolina, some rural areas have partnered with the technical college system to provide advanced courses, including some advanced math and science courses. Partnerships among colleges, universities, and secondary schools offer college courses through dual enrollment programs (Alford et al., 2014; Rimm-Kaufman, 2018). These partnerships offer college work, and AP programs provide college-level curriculums to many schools, including small, rural South Carolina high schools. Schools that provide these courses allow students to take advantage of this affiliation to earn an associate's degree in high school (Gagnon & Mattingly, 2016). Gagnon and Mattingly (2016) identified dual enrollment as a solution to inequity in more remote and less populated schools in their quantitative study of such schools. These schools may still have to overcome the issue of distance to a tertiary institution to qualify for dual enrollment courses (Gagnon & Mattingly, 2016). The leaders of the technical colleges, colleges, and local high schools enter into an agreement or partnership to provide dual enrollment to their rural students.

These dual enrollment courses are broadly accepted methods of earning advanced coursework credit. Certified instructors teach the courses; all public South Carolina colleges and universities accept these dual enrollment courses. The courses provide students with more opportunities to learn, especially in advanced math and science; students are more likely to be college and career-ready from these experiences (Alford et al., 2014; Goldman, 2019; Rim-Kaufman et al., 2018). The OTL in advanced math and science courses gives students more opportunities to prove themselves academically to colleges and universities. The outcomes vary in the success of these programs and how a school implements them in rural schools.

Some districts and technical colleges have sought agreements to work together. Focusing on rural community needs through this relationship and connection makes possible effective changes such as dual enrollment. The change allowing dual enrollment is not a state mandate but a tie to a rural place's political, economic, and sociocultural context (Klar & Huggins, 2020).

**Conclusion**

In this literature review, I described the purpose of complexity leadership theory (CLT) in my study. The framework of CLT enables a system capable of innovation to actively seek solutions. Leaders in such a system have restraints such as mandates and laws, as do other schools, but to provide more for the students, non-linear leadership is needed. These leaders seek to provide a quality education for students regardless of where they go to school. Rural school leaders can create positive change through connection with the community.

Rural leaders have a history of inequality that needs to be overcome to provide more for rural students in South Carolina. Access to advanced courses and programs is also hampered by small rural schools being in remote areas of the state without proximity to many higher education partners. Research has also shown that students in impoverished schools with a large minoritized population typically have less access to advanced courses. This problem is due to less funding and the required advanced degrees to teach the traditional AP courses. In rural areas, low enrollment, low interest in specific advanced courses, and fewer quality staff providing better preparation for advanced work create a question of which issue came first.

Providing more student opportunities to learn in advanced courses is a desire of many school leaders. One such solution some public-school leaders found in rural South Carolina was to partner with one of regional technical colleges. These two-year colleges have instructors qualified to teach college level subjects. Students in some areas are served by dual enrollment

programs where high school students earn college credits while still working towards their high school diploma.

# CHAPTER 3

# METHODOLOGY

As a student and later a teacher in rural South Carolina schools, I realized that rural students' opportunities to learn (OTL) were less varied and offered less advanced work than in suburban and, in many cases, urban schools. With this epiphany, the simple question, “Why?” began my quest for answers. However, asking “why?” is insufficient for researching inequity in OTL advanced math and science in rural South Carolina schools. In this case study, I analyzed how select South Carolina rural high school leaders offered or supported the continuation of advanced programs in math and science through Advanced Placement (AP) or dual enrollment. Some high school leaders offer their students the opportunity to take dual enrollment courses and possibly complete associate degrees by the end of their senior year. Seeing these opportunities in some rural areas caused my question to shift from “Why can’t we?”’ to “How can we?” The shift was from a deficit mentality to an asset mentality.

## Purpose

In this study, I analyzed how select rural high school leaders in South Carolina offered their students more OTL. Offering learning opportunities varies by location and typically ties into the context of the place or the community (Biddle & Azano, 2019; Klar & Huggins, 2020). Some studies exist on rural schools and advanced OTL in the United States. However, I have found no studies concerning rural South Carolina school leaders providing OTL in AP or dual enrollment in math and science.

By offering qualitative insight into the context of place and the stakeholders in rural South Carolina high schools, I show, in this study, how two South Carolina rural school principals and other leaders identified by the school principals made it possible to offer their

students advanced OTL. The purpose of this study is not to provide a generalizable study for replication in the diverse and varied locales that constitute rural America; this is not the job of a qualitative researcher (Glesne, 2015). After all, forcing a wide-ranging comprehensive study of the OTL in rural schools would ignore the uniqueness of each rural community (Allen & Roberts, 2019). Furthermore, a case study's context and qualitative power are lost by not recognizing the school principal and other leaders' unique places and positions in a rural community (Yin, 2009).

For this dissertation, I conducted semi-structured interviews with two small rural South Carolina high school principals and other school leaders identified by the principals. The interview protocols consisted of open-ended questions to provide richer answers specific to each school site's environment (Creswell & Clark, 2017). In Creswell and Clark's (2017) work on data collection in mixed methods research, the researchers pointed out that "qualitative data collection seeks to develop an in-depth understanding from a few people" (p. 188). My qualitative exploratory multiple-site case study probed specific data, which provided insights into how rural school leaders use resources to provide their students with advanced courses.

I hypothesized that semi-structured interviews of principals from two select rural South Carolina high schools with a small student population would provide an in-depth, qualitative context for understanding how they provided their students with OTL in advanced math and science courses. Additional interviews included other school or district leaders the high school principals identified as people who played a crucial role in providing this benefit for their students. I used the complexity leadership theory (CLT) lens to recognize each rural school leader's contributions to ensuring their students had more OTL in their communities. My study's

research question is: How do rural South Carolina high school leaders provide their students with opportunities to learn in AP or dual enrollment math and science courses?

**Delimitations**

To answer my research question, I intended to select two to four willing principals for semi-structured interviews. This process was aided by asking experts in the field for nominations of school leaders to participate in the research. In addition to school principals, I interviewed other leaders recognized by the principals for their part in maintaining or establishing advanced OTL for rural students in their schools. My goal was to reveal how principals and other school leaders use available resources to overcome the stark reality quantitative research reveals about the lack of advanced math and science courses in South Carolina's rural schools.

**Methodology**

The methodology I used to answer the research question was a qualitative exploratory multiple-site case study. To understand the choice of this methodology, an examination of the rationale for this research is essential (Crotty, 1998). Case studies allow researchers to answer questions about how or why (Yin, 2009). A case study is key to understanding current events where the researcher cannot control their behaviors; however, they can interview the persons involved and observe the events as they occur, making a qualitative case study unique (Yin, 2009).

More qualitative rural education research is called for by those who realize that qualitative education research provides the "why" behind an action's success or failure. The "why" is missing in quantitative work due to inherent generalizations that quantitative work leads to for many researchers and professionals (Kolluri, 2018). Particularly in rural education research, vast data samples can be collected and disaggregated only to have researchers gloss

over the sample data from hundreds of rural schools (Coladarci, 2007). The contextual insight that a single qualitative case study or multiple site case study can provide is absent in quantitative research yet necessary for my study.

As qualitative researchers engage in case study research, answers to questions, including how and why, come into focus (Creswell & Clark, 2017; Yin, 2009). This focus in my research study highlighted how leaders created or maintained a change in the academic curricula of their rural schools in harmony or disharmony with local stakeholders. As Yin (2009) noted, "The case study will typically be about complex events and behavior occurring within a possibly more complex real-life context" (p. 129). A researcher cannot make meaning in qualitative research through the constructionist lens without drawing on the historical and social background of the subjects in the study (Crotty, 2013).

In a pluralist view, one cannot separate the person from their surroundings. As Budge (2006; 2010) explained, you cannot separate a person from their place. The context of the interactions and realities of where, how, and why situations occur is critical (Baxter & Jack, 2008; Klar & Huggins, 2020), particularly in my study of rural education. The context of where a case study takes place, the people, and the community is essential (Klar & Huggins, 2020; Yin, 2009). The data collected in my research provided further insight into how small rural school principals and other school leaders increased OTL in AP and dual enrollment in math and science for rural South Carolina students.

In this qualitative exploratory multiple-site case study, I used complexity leadership theory (CLT) to view the totality of the complex environment the leaders were in and make sense of their decisions to provide more OTL. Using CLT, the context of the sites, subjects, politics, economics (Klar & Huggins, 2020), and place (Budge, 2006; Gallay et al., 2016) of the

communities flowed through my study. Using CLT and case study methodology allowed me to focus on the process and pathways that made this possible.

The exploratory multiple-site case study was necessary for my work due to the diversity of rural South Carolina high schools. Studying the same research question at multiple sites allowed me to analyze each case while comparing cases (Baxter & Jack, 2008). A multiple site case study strengthens my study by providing more than one site and potentially varied answers to my research question (Yin, 2009, 2012). The two sites in my study addressed a common external validity issue of generalization (Yin, 2009). With multiple schools that operated under similar regulations in the same state, I looked for the solutions the selected rural school leaders employed to create additional opportunities for their students. This information can be helpful elsewhere, and this approach was practical for my research.

## Research Methods

This dissertation was a exploratory multiple-site case study of two rural South Carolina high schools. Participants were the principals and other leaders in these rural high schools that offered their students advanced OTL, particularly in math and science. In this chapter section, I describe my study methods, including site selection, data collection, and analysis.

### *Site Selection*

Similarities exist among some rural areas, but each place is as unique as the natural world and the people living there. I studied two purposefully selected rural South Carolina high schools offering OTL advanced math and science in AP or dual enrollment courses for this study. The purposeful selection of the sites increased the opportunity for me to find clues about the rural high school principals' and other leaders' ability to offer more OTL to their students.

Schools in my study were limited to those high schools within South Carolina that were designated using NCES locale codes: rural or town and the sub-locale codes of fringe, distant,

and remote. The total number of high schools in these categories at the time of this study was 130 (NCES, 2020). The average student enrollment in these categories was 819 per school (NCES, 2020). I limited the student enrollment to schools of 650 or less with a locale code of rural or town (NCES, 2020). These smaller enrollment schools receive less funding and have a more difficult time providing a range of courses to students. This parameter brought the potential number of school principals in the study to 61 (NCES, 2020).

Of these 61 schools, those in the NCES rural-distant code under the enrollment limit were 32 (NCES, 2020). The number of schools in the NCES rural fringe code under the enrollment limit was 20 (NCES, 2020). There were two schools in the NCES rural-remote code (NCES, 2020). Those schools in the town-distant and town-fringe NCES codes that met the enrollment limit were six and one, respectively (NCES, 2020). By limiting schools through their enrollment, I eliminated schools with a possible advantage of funding that is more than what some may view as a small rural school in South Carolina, which ties funding to student enrollment.

Because the larger rural and town schools have fewer students who receive free or reduced meals, they can skew data away from more typical information in smaller schools. The average percentage of South Carolina students receiving free and reduced meal prices in rural and town schools at the time of the study was 70.3 (NCES, 2020). Limiting schools by population increased the free and reduced student percentage to 91%. Free and reduced meal prices can indicate funding or support limits. Still, I postulate that these students, families, school leaders, and staff are resourceful, resilient, and can overcome many challenges.

The school principals were from rural or town-labeled schools. As noted by NCES locale codes, these schools had a student population of 650 or less at the time of this research. After receiving permission from Clemson University's Internal Review Board (IRB) to conduct the

study, I identified potential principals and research sites for qualitative data collection. I then contacted the superintendents of the districts in which these high schools were located to request permission to conduct research with the individuals in the selected schools. Permission was granted by the superintendents to conduct my research.

My interviewees were the principals and other leaders of two rural South Carolina High schools. Initially, I wanted to interview principals and other leaders from three rural South Carolina high schools. Three district superintendents agreed to allow their principals to participate in the study.

The principal and two district-level leaders agreed to participate in this work in one district. The district-level staff involved were the chief academic officer and career and technical education director. The principal agreed to participate in the second district, but other leaders declined or were unavailable for interviews. Their unavailability was due to scheduling conflicts. In a district approved for study, the high school principal accepted another position, and a new principal from outside the area was hired. As a result, I chose to exclude the third district from my study.

To draw some conclusions about solutions to this problem, I used purposeful sampling or intentional selection, a tool for researchers that recognizes the uniqueness and context of each case (Maxwell, 2005). Just as a case study is unique, each rural community is unique (Allen & Roberts, 2019). Possible solutions developed by rural leaders to provide OTL in these selected schools (Hall & McHenry-Sorber, 2017) are also unique. My study of rural South Carolina high schools and the purposeful sampling of participants added to the strength of qualitative research that identifies local processes and contexts (Maxwell, 2005) of place (Budge, 2005). So, instead

of generalizations, which are not the intent of qualitative studies, using multiple sites in my exploratory multiple-site case study produced more validity.

***Data Collection***

Seeking the approval of rural district superintendents for potential rural school principals and other potential willing participants that fit my criteria helped to focus my work on data collection through documents, field notes, semi-structured interviews, and subsequent data analysis. I reviewed public information, documents, and related artifacts from participating school leaders for developing initial codes and eventual themes. These items helped reveal the selected sites' local processes, meaning, and context that increased the OTL in case-specific rural high schools (Maxwell, 2005). Initially, I found information and answers, which led to deeper questioning and subsequent answers in the semi-structured interview process.

My questions for the semi-structured interviews were based on information I gained through the existing literature. Also, my experience working as a teacher and an administrator in rural South Carolina high schools contributed to this protocol. The semi-structured interview was necessary to determine how rural high school principals offered advanced OTL for their students in math and science or how these individuals continued to provide these programs for their students. Using the semi-structured interview questions allowed me to ask the same central questions to all interviewees while asking follow-up questions that elicited richer answers based on the respondents' answers (Brenner, 2006; Brooks & Normore, 2015).

This structure allowed me to ask for examples, clarification, and open responses on a topic raised by a response from a school leader (Brooks & Normore, 2015). This approach also allowed me to record valuable data, which helped answer my research question. I wanted to know what was unknown to me that was at work in these systems that supported, guided, and increased the OTL for students in these rural South Carolina high schools.

I used the information from my literature review's most critical points to help form the development of the semi-structured interviews with rural school leaders (Glesne, 2016). This approach allowed for conversation-style data gathering while ensuring similar questioning occurred at each site. To assist me, I created an organizational chart with a citation of key articles from my research (see Appendix A). In each article of my literature review, I found the main or key findings and implications for practice and future research that I thought may prove helpful in my study.

This organization of information coincided with themes in my literature review. Some examples from my protocol are: *What does increased OTL mean for rural students?* This question arose from Chen's (2015) and Koricich's (2015) research. *What does OTL in AP and dual enrollment in math and science mean for students at your school?* This question is from research by An (2015), Byun et al. (2017), Gagnon & Mattingly (2015), Koricich et al. (2018), and LaValley (2018). This organization method gave me a more defined and organized body of information to create a protocol for semi-structured interviews (see Appendix B).

In the semi-structured interview, the researcher can have an open forum where answers may lead to more questions for clarification or explanation. A qualitative study requires flexibility, which may change once data collection begins (Maxwell 2005; Yin 2009). This "refinement," as Glesne (2016) stated, may be needed as you conduct research, but the boundary of revision is the foundation of the literature review. This foundation grounded my thoughts and interviews to focus on answering my research question.

Each interview lasted an average of 50 minutes. These interviews took place during October 2024. The month of October is well after the start of the school year and before any vacations and holidays in most schools in South Carolina. The interviewees chose the times and

dates of the interviews through selected appointment time slots available in October. The interviews were concluded promptly, capturing a snapshot of where these school leaders were in their work.

The subjects participating in the interviews were assured that their answers would be kept secure and confidential. I recorded the interviews through Zoom's recording feature and used Zoom's associated transcription service. I reviewed these transcripts, cleaned them for errors, and removed unnecessary sounds. The interview data, notes, and data gleaned from public information and documents offered to me were kept on a secure data management system that was password protected.

***Data Analysis***

I saved the cleaned transcripts, field notes, and documents as Word documents (Yin, 2009). I uploaded the data files to NVivo 14, a computer-assisted qualitative data analysis software (QDAS) (Creswell & Clark, 2018; Creswell, 2013; Glesne, 2016; Yin, 2009). This program assisted me in highlighting inductive codes that emerged from the transcripts, field notes, and documents. In my work, I kept in mind Glesne's (2015) advice that researchers should attempt to put aside their prior knowledge and frameworks, but this is impossible. The more important takeaway is not to have a priori codes forced on your data (Glesne, 2016). Creswell (2013) suggested that researchers be open to new codes that arise during data analysis.

With this information in mind, I read over the data line by line. On my first reading of the transcript from the interviews with the school leaders, I looked for trends and initial concepts in the interview data (Creswell & Poth, 2018). I recognized key phrases and words in the transcripts and aggregated these pieces of data into small categories of information, creating codes (Creswell, 2013). I recognized the initial codes and noted why I believed they were present and their connection to my research question (Creswell & Poth, 2018; Yin, 2009). Coding the

transcripts provided only part of the evidence in my research. Using memos, fieldnotes (Yin, 2009), and researcher experiences offers more depth to the data derived from the coding and theme process (Creswell & Clark, 2018; Glesne, 2016). These processes helped develop the richness that I needed to help give a complete picture of my case study.

I combined those initial codes into a small number of themes (Creswell, 2013; Creswell & Poth, 2018; Yin, 2009). These themes and codes were further organized into overarching themes and checked for trustworthiness and reliability (Creswell & Poth, 2018). Using these themes as a basis for thematic analysis, I sought to reveal any complexities under the surface (Yin, 2009; Glesne, 2016). This analysis revealed differentiating answers to my research question. I sought to find out how the leaders in the schools of the cases in my research provided their students with more advanced learning opportunities. Table 3.1 highlights the original codes that emerged after rounds of coding and dissecting interview data.

Table 3.1

Codes from interviews, themes, and big themes

| Deductive Codes from Camp County | | Themes | | | Big Themes |
|---|---|---|---|---|---|
| Cooperation | | Cooperation | | → | Cooperation |
| Logistics | | Communication | Logistics | | |
| Communication | → | Parents | Staff | | |
| Parents View | | Community | Location | | |
| Liaison | | | | | |
| Colleges | | Colleges | | → | Dual Enrollment |
| Dual Enrollment | | | | | |
| Courses | | Dual Enrollment Courses | | | |
| Location | → | Liaison | | | |
| Community | | Requirements and Responsibility | | | |
| No AP | | | | | |
| Staff | | | | | |
| Requirements | | | | | |
| Student | | | | | |
| Responsibility | | | | | |

| Deductive Codes from Farming Valley SD | | Themes | | | Big Themes |
|---|---|---|---|---|---|
| Dual Enrollment | | | | | |
| Courses | | Cooperation | Logistics | → | Cooperation |
| Logistics | → | Community | | | |
| AP | | Communication | Location | | |
| Location | | | | | |
| Community | | Colleges | | → | Dual Enrollment |
| Colleges | | Dual Enrollment Courses | | | |
| Liaison | → | AP | | | |
| College Courses | | | Requirements | | |
| Communication | | | Liaison | | |
| Requirements | | | | | |

### *Trustworthiness*

To ensure an accurate reflection of the interviewees' thoughts in their interview, I offered them an opportunity to review the interview transcript. This form of trustworthiness, member

checking, ensured that the research captured the essence of the interviewees' intent (Brenner, 2006; Glesne, 2015). I also addressed trustworthiness or validity concerns by offering portions of my draft writing to interviewees for an additional form of member checking that limited the time I asked them to give me while allowing them to review the writing in which their words appeared (Glesne, 2016). This type of review produces trust, aiding in accepting this or future studies. Some researchers offer a working draft so that the interviewee may see the writing in the context of the research project (Glesne, 2015). This process allows someone unfamiliar with the researcher's internal thoughts to help clarify the writing.

I submitted my interview protocol to my committee chair for review to ensure content validity. The protocol was developed from several points that stood out in my literature review process. From selected articles, I created an organizational chart to assist me in developing my protocol. A sample of this chart and my protocols are shown in Appendix A. This step ensured that I would likely get the data needed to answer my research question from the semi-structured interviews.

Using multiple principal interviews, source documents, and related artifacts for data addressed possible validity issues (Glesne, 2016; Yin, 2009). This data triangulation addressed validity issues arising from single data sources (Lunenburg & Irby, 2008; Yin, 2009). This process effectively increased the research result's trustworthiness (Brenner, 2006). In my qualitative research, the validity, or the acceptance of the story, as told in my writing, is related to the trustworthiness of my data (Glesne, 2016).

**Limitations**

The design of this study limits its scope. I conducted this research in only two high schools in rural South Carolina. The data was limited in generalizability as a qualitative

exploratory multiple site case study of two selected small, rural schools. A study such as this is not generalizable to all rural schools but generalizable to the theoretical propositions identified (Yin, 2009). As the qualitative researcher in this exploratory multiple-site case study, I identified the contextual conditions and leadership decisions that led to more OTL in advanced math and science in two rural South Carolina high schools. This statement does not propose that this study's findings may apply to other rural locations. In the end, the job of a qualitative researcher is not to produce generalizations (Glesne, 2016). The idea of generalizations that apply broadly to similar locations is typically associated with quantitative research.

The NCES codes used to help identify my potential study sites which is not unusual in rural education research (Grant et al., 2024). Grant et al. (2024) identified rural definition triangulation (RDT) as a way to categorize rurality in education research. This was achieved in my study by employing a governmental agency definition, a thick description of each rural research site, and member checking to ensure that I captured the essence of these rural locations (Grant et al., 2024). My study aimed to examine qualitative data and use that data to explain how two rural principals and other leaders could offer their rural high school students more advanced OTL.

**Positionality Statement**

I am passionate about rural education, the possibilities, and the opportunities found in them. I have almost three decades of experience working in rural public high schools in South Carolina. I taught in the schools and with the students and communities that I care about. When the opportunity arose to become an administrator in one of these same schools, I tried to make a difference on the school level. As an administrator, I began to ask other administrators questions.

During professional development, I asked how our actions affect students' ability to learn math, science, English, and social studies.

As I began my journey in a doctoral program, that question morphed into how rural students can have better opportunities. I noticed how students at my schools, compared to students in more populated or affluent areas, had inequitable academic options. My school and a few others began offering students more AP and dual enrollment courses. This was when my study of how some small rural schools could offer these advanced courses began to take shape. To check my biases regarding my familiarity with these processes in my district, I chose other rural high schools in which I have no working relationship (Creswell & Poth, 2017).

As stated, I am passionate about rural places and people. With my work and drive to support rural students, I considered my understanding of the administrative processes that come into play in rural South Carolina schools. I also set aside my biases and personal experiences while investigating prior research that did not specifically address my question but framed a research gap. This is what is known as substantive and ethical validation (Creswell & Poth, 2017; Angen, 2000). I also used multiple research sites to study, and I conducted an extensive literature review and data observation to produce a triangulation to increase the validity of my findings (Creswell & Poth, 2017). My research provides insight into select leaders' decisions in two small enrollment rural South Carolina high schools. The context of these places and the school leaders' decisions provide information for other rural education researchers and school leaders. Though I was a rural school insider, I guarded against relying on my experiences. Instead, I aimed to prove the value of my collected data (Creswell & Poth, 2017). The small rural high schools in South Carolina provided my passion for this work.

## Conclusion

In this chapter, I presented the methods for my dissertation. A qualitative, exploratory multiple-site case study answers the question of how rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses. The reasoning I used to reveal my research question is that not all rural schools can offer advanced OTL. However, some rural schools can offer advanced OTL. The question of how school leaders led in a school that created more OTL or ensured the continuation of advanced OTL for their rural students emerged. Having revealed the solutions that some rural schools found to help their students, I hoped to help other leaders provide more opportunities for their students by conducting this study.

# CHAPTER 4

## STUDY FINDINGS

In rural areas, there is a need for more opportunities to learn (OTL) for students. Some rural South Carolina high schools can provide more OTL for their students. In my exploratory multiple-site case study, I examined how leaders in two of these schools offered advanced courses and more OTL for their students. In my study, I found that cooperation among rural high schools and higher education partners led to more OTL. Leaders cooperating to provide courses and communicating these opportunities to the community led to family and community support for more advanced courses in these rural communities.

Support was also prevalent in each study site by the higher education partners providing staff for the courses. The rural high schools ensured students were aware of opportunities, and the college level of rigor and the application process. Logistical support also was provided by the rural high schools in offering transportation, meals, and support. To do all these things in a rural high school the school principal and perhaps the superintendent must enable the leadership system the freedom to seek solutions from adaptation which occurs in the informality of staff and teacher groups or interactions between other official and unofficial school leadership. These findings are detailed in this chapter, I provide information to answer my research question: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses?

I found that selected rural principals and district leaders who participated in my study partnered with the associated technical college to provide dual enrollment courses for their students. Each high school also partnered with a traditional four-year university. One partnered for an engineering and a teaching program, and one partnered to continue offering more

advanced science courses. School leaders developing these programs were entwined with their rural students, stakeholders, and community needs.

In the first section of this chapter, I present my research findings and a description of the rural communities in my study. I then provide a brief background of the study participants. In the next section, I present the findings of my research. The overarching themes of my study were what the leaders in these schools did to encourage cooperation and advanced coursework. The sub-themes revealed under cooperation were community, communication, logistics, and location. Under the theme of advanced coursework are the sub-themes: colleges, dual enrollment, AP, liaison, and requirements.

**Study Locations**

In this section, I describe the rural areas in my study. These places are microcosms of many rural South Carolina communities in the southeastern United States. Both school districts were given pseudonyms, Camp County and Farming Valley. All the mentioned school and district leaders were given pseudonyms. To better define the areas that served as my study's focus, I paint a picture of the communities where these schools are located. Next, the participants themselves are described. These descriptions of the places and people at the heart of this study are intended to give a general description of the context of these rural places. Participants in my research study were from two high schools in different rural communities in South Carolina.

Camp County and Farming Valley County are two rural counties in South Carolina. At the time of my study, Farming Valley County had nearly double the population of Camp County. Farming Valley County had more job opportunities and boasted a 15% employment advantage over Camp County. Camp County had a higher median income of $55,569 than Farming Valley County, at $51,041, which could be accounted for by Camp County's closer proximity to a

federal employer and other industrial areas.

Camp County's school district covers the entire county. Farming Valley County is served by other school districts as well as Farming Valley School District. The two neighboring districts are more populous and have less poverty than Farming Valley School District. The median income for the Farming Valley School District was lower than the county-wide figure at $46,496.

The two school districts in my study consisted of two small towns that serve as their county's seat and are the hub of decision-making for each county and district. Camp County and Farming Valley are similar in that both had a vibrant textile industry and farming a few decades ago. Visiting these areas now, only the remnants of old mills and many overgrown fields mark these past changes in the local economy.

In Table 4.1, I chose several socio-economic categories to give a better statistical view of Camp County and Farming Valley school districts. The average commute to work in the most recent census data was similar. Both areas had limited access to employers in their respective areas. With a commute time of over thirty minutes for each community combined with limited employers in each district, poverty is an issue for many in the districts I studied.

In Camp County, the poverty rate was 17%, and in the Farming Valley School District (Farming Valley SD), poverty affected 20% of the general population (U. S. Census Bureau, 2022). Poverty affecting persons under 18 in these areas was 37% in Camp County and 22.0% in Farming Valley SD (U.S. Census Bureau, 2022). To further the societal awareness of these study areas, I point out that 95% of Camp County residents had health coverage, with 83% of Farming Valley SD residents having coverage (U.S. Census Bureau, 2022). The percentage of adults in

the areas of my study holding a bachelor's degree by age 25 was 14.6% in Camp County and 11% in Farming Valley SD (U. S. Census Bureau, 2022).

***Table 4.1***

*Study location demographics*

| | **Camp County** | | **Farming Valley District One** | |
|---|---|---|---|---|
| **Label** | **Count** | **Percent** | **Count** | **Percent** |
| Total population | 9,550 | 100.0% | 14,600 | 100.0% |
| 5 to 17 years old | 760 | 8.0% | 2,300 | 16.0% |
| Over 60 years old | 4,500 | 47.2% | 4,800 | 33.0% |
| Employment | | 37.0% | | 51.0% |
| Employers Est. | 100 | | | 230 |
| Median Income | $55,500 | | $46,000 | |
| Parents with children in public school – Median Income | (No data) | | $37,000 | |
| Poverty | | 17.0% | | 20.0% |
| Poverty under 18 | | 33.0% | | 22.0% |
| Health Coverage | | 95.0% | | 83.0% |
| Bachelor Degree (25+) | | 15.0% | | 11.0% |
| Avg. commute to work | 34.6 min. | | 34.4 min. | |
| Households with Broadband | | 77.0% | | 73.0% |
| English only at home | | 99.0% | | 80.0% |

(U.S. Census Bureau, 2022) *Numbers in table rounded to protect confidentiality

**Camp County School District**

In the 1990s, textile companies in Camp County moved on to seek cheaper foreign labor. As a result, some of the county's population moved away, seeking employment. Farming that existed primarily continued as cattle farms, while some farms began to blend into the forests. The population dipped with the 2008 recession (U.S. Census Bureau, 2022).

Over the past few decades, Camp County has grown into a bustling retirement area. In Table 4.5, this is pointed out by the 47.2% of residents who are over 60 (U. S. Census Bureau, 2022). At the time of this study, economic opportunity was still stagnant in Camp County, with an employment rate of 37%, which was not unlike other small towns throughout the non-interstate corridor areas of South Carolina (U.S. Census Bureau, 2022). The number of non-employed residents could be attributed somewhat to Camp County's high retiree age numbers. The median income in the county was $55,500, which was also misleading; 33.0% of school-aged children, lived below the poverty line (U.S. Census Bureau, 2022).

Camp County is unique in South Carolina because it borders a scenic river and another state. Much of the county to the east of the town is a national forest. These two factors have isolated Camp County and have limited the size of the school district's enrollment for years. As shown in Table 4.5, there were only 760 children aged 5-17 in the county (U.S. Census Bureau, 2022).

More recently, the Camp County community has embraced these factors. The county has promoted its proximity to a city in another state and its surrounding sprawl as a recreation area in both states. The lakes nearby are dotted with state parks, and more retirees than younger families currently occupy the newer developments. However, recreational areas associated with these factors have renewed interest in Camp County, which could hold promise for those in the area.

**Farming Valley School District**

Farming Valley once had dozens of dairies, wheat, and other small family farms growing row crops and livestock. Farming Valley was also well-known for its bustling textile industry from the early 1900s through the early 1990s. The textile industry was ravaged there, just as in many locations in the United States during the late 1980s and early 90s. Tariff reductions and access to cheaper foreign labor in producing goods spurred this change.

In the 1980s, the federal government paid many families not to plant their crops in various farming areas in the US. Instead of meeting the stated goal of regulating prices in agriculture production, this influx of money caused many families in Farming Valley and South Carolina, in general, to take the money and plant pine trees for future timber harvests over the once vibrant fields and pastures. Corporate farming expanded massively in other areas, reducing the need for the small family farms there. Members of these families lost interest in farming, and many moved away.

Mill workers, who could hold mill production jobs with little required education, now had no stable income source. Many of these people also moved toward larger population areas for work. In Table 4.1, this movement was reflected by an employment rate of 51.0% and a median income of $46,000 (U.S. Census Bureau, 2022). Those unable to move and lacking an education took multiple jobs in the service industry, attempting to make ends meet. Data from Table 4.1 regarding Farming Valley SD shows that the median income for parents with children in the public school district was $37,000 (U.S. Census Bureau, 2022). Poverty for those in this district under 18 was 22.0% (U.S. Census Bureau, 2022). Changes in Farming Valley SD are reflected in the technical education courses once taught in FVHS, such as Ag Mechanics and Industrial Sewing, which were no longer needed. Educational opportunities linked to an era

slipping away also faded into memory.

Farming Valley SD, as in Camp County, had factors playing into a possible reboot of the area's economy. The Farming Valley area boasts access to a large lake for recreation and power. The economy was awakening after being beaten down by budget cuts, government decisions, and corporate growth. A modern food packaging facility that opened in a shuttered textile mill is redefining food production while giving back to the local schools. A steady cattle industry and the growing poultry production push for more technical math and science knowledge. Regrowth and rebranding of this area and the science and technical expertise needed in large-scale fruit and vegetable production call for more advanced education in secondary schools.

The potential for economic recovery and growth is excellent in both Camp County and Farming Valley. With changes in the local and global economy, rural students must be readied to compete with students in the US and worldwide. There is a need for a more robust course of study, particularly in math and science, in rural areas. These two school districts are meeting the current need and are consistently improving on opportunities in Camp County and Farming Valley by listening to their stakeholders and working through cooperative agreements with nearby colleges.

**Study Participants**

With remembrance of how these areas were in the past, but with a look to the potential budding future of many rural South Carolina communities, I sought to find out how the principals and other leaders in Camp County and Farming Valley School Districts offered their students advanced coursework. The persons who agreed to participate in my study were given pseudonyms after the interview and transcription process took place. Table 6 lists the demographics of my participants. The pseudonyms given are the principal of Farming Valley

High, James Edwards, and Camp County High principal, Angie Norman. Other Camp County Schools officials agreeing to participate in my study were Janice Parr, the Director of Instructional Technology and Career and Technical Education (CTE), and Laura Thomas, the Chief Academic Officer.

***Table 4.2***

*Study Participants*

| Name | District Name | Position | gender | race/ethnicity | Years in Educ. | Years in Admin |
|---|---|---|---|---|---|---|
| James Edwards | Farming Valley High | Principal of Farming Valley High | Male | Black | 19 | 12 |
| Angie Norman | Camp County High | Principal of Camp County High | Female | Black | 30 | 19 |
| Laura Thomas | Camp County Schools | Chief Academic Officer | Female | Black | 22 | 10 |
| Janice Parr | Camp County Schools | Dir. Instructional Tec/CTE | Female | Black | 32 | 3 |

Mr. Edwards grew up in the Farming Valley area and graduated from Farming Valley High School (FVHS). He has been in education for 19 years, with twelve years in administration. He has worked in school districts away from Farming Valley but returned to FVHS to coach and subsequently became a school administrator in the district. Mr. Edwards is a black male who taught for seven years and recently served the district as an administrator for 12 years.

Camp County High School's principal is Angie Norman. Ms. Norman moved to Camp County in her grade school years and graduated from CCHS. She claimed Camp County as her home, having lived most of her life there. Ms. Norman began her teaching career in Camp County Schools and rose through the ranks to become an administrator. She wanted to give back

to her community and help improve the connections that led to increased opportunities for her students. She also had children who participated in the dual enrollment program, so her views were of interest because she first learned about the program with her children and later as an administrator. Ms. Norman is a black female who taught for eleven years before becoming an administrator in Camp County Schools for the past nineteen years.

Camp County School District's Chief Academic Officer is Laura Thomas. Ms. Thomas is a black female from Camp County. She graduated from CCHS and still lived in the area. Thomas began teaching in another small school district about an hour's drive from Camp County and then moved back to her home district. She told me in her interview that she felt that this was crucial for her growth and helped her have a firm foundation in her professional life before facing the rigors of returning home. Ms. Thomas had twelve years of teaching experience and ten years as an administrator. Ms. Thomas provided insight into Camp County's dual enrollment offerings as a parent, community member, and administrator.

Camp County Schools' Janice Parr is the Director of Instructional Technology and CTE. She has been in education for 32 years and is in her third year as an administrator. Although she is not from this area, she worked most of her career in a small neighboring school district. Ms. Parr also worked in adult education in a larger setting before returning to the familiarity of the small rural school district.

**Study Findings**

My study examined the need for advanced courses in rural high schools. The less exposure or opportunity to advanced courses, the less likely rural students are to pursue higher education successfully. The more rural, the lower the enrollment, and the more impoverished the area is, the less likely rural high schools offer access to AP courses at 51.4% compared to

suburban, 93.8%, and urban districts, 97.3% (Gagnon & Mattingly, 2016). The schools in this study follow this pattern. However, both Camp County and Farming Valley School District leaders work with the regional technical college and traditional universities to provide dual enrollment courses for their students. The rural high school pathway for more advanced course offerings in my study was through partnerships with higher education.

In the following sections, I review the findings of my study at Camp County High School, followed by the findings from Farming Valley High School. In these two cases, I review the major themes that emerged from the data. These themes included cooperation including communication, and community. Dual enrollment is the prevailing method of advanced course delivery in these two rural communities. Finally, I show how the principals and other leaders saw their students take ownership of their course of study.

**Camp County High School**

Many years ago, Camp County was in the news media in a disparaging series that detailed an educational system with deficits. While working with other rural districts in the Central Educational Consortium (CEC) in South Carolina, local leaders found a solution. They chose a dual enrollment program as the preferred method for students in this school to take advanced, college-level courses. This need was evidenced by the fact that Camp County High School (CCHS) did not have any Advanced Placement (AP) courses at the time of my study. In this section, I define how leaders there built on the foundation of dual enrollment for a robust future. In a cooperative effort, leaders found ways to make advanced courses the expectation. Table 4.3 highlights the major themes found in the collected data and the evidence of these themes in Camp County High School.

***Table 4.3***

*Examples of findings in Camp County*

| Themes from data | Evidence |
|---|---|
| Cooperation | Agreement with PVT for dual enrollment<br>Agreement with Greenview University for advanced science dual enrollment |
| Communication | The Superintendent ensures that good relations including communication exist between the district and the higher education partners<br>The principal ensures parents have information on the options for students<br>Counselors ensure students have information on dual enrollment options |
| Community | School board is active in the community and supports students in dual enrollment paying for all costs<br>Communicating to parents in formal and informal settings allows for open ended dialogue about the dual enrollment offerings<br>School leaders have also had their own children benefit from dual enrollment which lends credibility to their talking points |
| Dual Enrollment | College instructors reduce class sizes in the regular classroom leading to better personalization |
| Logistics | Liasion partners provide support with check ins<br>Leaders ensure programs are prvoiding what CCHS students neeed and want for dual enrollment |

| | |
|---|---|
| | Transportation is a moving target to work out who needs to go where |
| Responsibility | Students can see what college academics are<br>Formal and informal liasions have worked for the students and between the college partner and the high school<br>Staff works together to ensure students have what they need to be successful. |

***Cooperation***

At the time of my study, Camp County had an agreement with Prairie View Tech (PVT) to provide dual enrollment for twelve years. Principal Norman's role was to keep and maintain the school's connection with their higher education partners. This ensured that students had every possible avenue to be successful at Camp County. Principal Norman said that in working with PVT,

> Roughly 20-30% of our students want to do dual enrollment through Greenview or PVT. Some want to start careers when they graduate in welding and other occupations, so we work with PVT and with a neighboring district to ensure our students have what they need. We also have a career person this year to work with those kids on those microburst training skills.

The career person mentioned by Norman was Janice Parr. Ms. Parr is an example of how most administrators in small rural districts serve in many roles. In addition to her role as a career facilitator, she was also over the technology staff in Camp County. Serving in many roles also

opened avenues for more communication and feedback from students, families, and other stakeholders.

### *Communication*

Teamwork defined those interviewed from Camp County. Even the district superintendent took a role in this process. Chief Academic Officer Laura Thomas noted, "Our superintendent, she makes sure that she is making those connections with the presidents of the various colleges." The superintendent appeared to take on the role of a pseudo-liaison to ensure the colleges were thinking of Camp County in decision-making.

Principal Norman was a confidant for the parents to turn to for information. Principal Norman felt that she is approachable to parents and the community. Like most small enrollment rural school leaders the parents knew that she can be called upon most anytime. She seemed to pride herself on being available in person to answer questions about the school as well.

The familiarity and openness shown by Principal Norman enabled parents and students to feel at ease discussing available options. Parents had input on their child's courses, and the students realized they have these opportunities. During their IGP meeting with the guidance department, they all became aware of it. The beauty of it is that the students become aware of what they want to do.

### *Community*

The community has been an advocate for dual enrollment. Chief Academic Officer Laura Thomas, "Our county council has active members who serve on the PVT board. They support our efforts, our churches, ministerial groups, and even our school board itself." Thomas spoke about how the schools are financially supported by the community. This support was such that the students did not have to pay out of pocket for anything related to their advanced courses. The Camp County school board was very generous in ensuring the kids had those opportunities. Ms.

Thomas told me that the school board pays costs that families would have been responsible for in the past.

Above, I mentioned the informal way Ms. Norman put parents and students at ease when considering college classes. Principal Norman gave information to the community to increase knowledge of the options for students. It was important for her to get out the information that the dual enrollment program were available to the students in the community. “When a parent knows that their child could qualify for a dual enrollment program. They want to know more about it,” stated Norman. The principal and other leaders interviewed from Camp County had a knowledge of the community and the homes of their families. They understood the transformative nature dual enrollment can have for these students.

Norman had parents reach out to her at the end of the student’s eighth-grade year and the beginning of their ninth-grade year. Parents felt that their students who did so well in eighth grade, taking their math and English 1 as well as geometry, needed more advanced courses. Many of the informed parents realized that their students can perform and achieve. Norman said leaders tried to balance all that and get them in Algebra 2, or Prob Stats. The parents, with an increased knowledge of the possibilities, wanted to talk with Principal Norman. The exchange of communication was appreciated by Principal Norman as well, “I was very grateful because I got a chance to see how they felt about their child’s education. It was enlightening to know that although they trusted me they wanted to have a voice, and that was important.”

As parents themselves, these leaders had children go through the dual enrollment program. Ms. Thomas, chief academic officer, was a parent of a child who went to a major university in South Carolina after earning his associate’s degree through PVT while a student at Camp County. She spoke about her son having his own goals and motivations for his education

in high school and beyond. Although her son had an associate's degree at the end of high school he realized that he needed more advanced math courses during high school. Ms. Thomas states that this is a process they are continually refining to meet student needs.

Principal Norman was also a parent of two dual-enrollment sons. She felt that their work in high school was a very good thing. It showed her sons the importance of a good work ethic and study habits for college. It gave the family an idea of what would be required in college of the students. This was a good learning step for Norman's sons as she worked with them on the academic demands of college.

Janice Parr is the Career and Technical Education Director and over the IT department for Camp County. As a parent she had a son take dual enrollment in high school. She reported, "It made him maintain his grades and follow them closer. I think this was good, and it kept him on his toes, which made him a better student."

Ms. Norman further described the responsibility and ownership of the dual enrollment program. Her sons went through the dual enrollment program over a decade ago and she was not able to choose courses with her children like parents can now. Things were different in Camp County High School at the time of my study. Parents and students were active in selecting courses and possible college pathways. Ms. Norman added that the success of the dual enrollment program in Camp County had brought "about community pride because of our dual enrollment. We were graduating the most students in PVT's program."

***Dual Enrollment***

A unique advantage of dual enrollment partners like PVT was that it helped small-enrollment rural high schools with qualified staff, particularly in math and science. As with many rural areas in the United States, there are well-documented teacher shortages in South Carolina as well. Camp County with their high education partners can add more personalization by having

more teaching staff than is typical in some rural schools. The dual enrollment courses were all taught by Greenview University and PVT staff

This delivery format reduced class loads for the CCHS teaching staff. Chief Academic Officer Laura Thomas stated, “PVT felt they were being underutilized in the community. They reached out to the schools, or the schools reached out to them. Today, we have this opportunity for students to gain their associate’s degree” before graduating high school.

PVT was not Camp County’s only partner. Greenview University, a regional four-year school, provided student access to upper-level science courses. This increased access for Camp County students. Greenview has respected health sciences programs of study. The city where Greenview is located also has advanced manufacturing and a genetics center.

At Camp County, students began dual enrollment classes with PVT beginning the summer before their junior year. The program ran year-round, and the school district had a modified schedule for traditional classes. The students took a placement test to determine what courses they were eligible to register for. The colleges came to Camp County High to help the students with the registration process. The liaison position worked between Camp County and the colleges to ensure that the process was fluid and working for the students. Ms. Norman noted that the communication between the university, technical college and school leaders during the planning for each year has added to what the partners are able to do for the students. As noted in my literature review, staff taking an interest in student progress and giving support was also evidenced by Norman’s comments. She explained, “The staff in our schools may check in with the students, asking, ‘Are you keeping up with your work?’ and those things. This let the students know that they have advocates in their high school staff that can be part of their support network.

### *Logistics and Location*

Transportation for school-level and district-level leaders was a hurdle that took time to work out among the various moving parts in Camp County. According to Principal Norman some of their students went to the Greenview University campus for classes. This provided Camp County students the opportunity to see what college life can be like. Norman said that this allowed their students to see the expectations on campus and to get a taste of what the expectations are when they leave and go off to school.

Chief Academic Officer Laura Thomas added that the district had a great transportation department that helped tie all the logistics together. At times, other members of CCHS helped. Staff members with the proper licensing to drive helped out from time to time to get the kids to class. Principal Norman spoke of such a day when the school was closed, but the college classes went on as scheduled at their locations. Norman said that a staff member came in to make sure the students had transportation. Norman affirmed that the district leaders and school leaders worked together on the transportation.

Students in Camp County attended the PVT dual enrollment courses at the county campus of PVT. Typically, instruction was face-to-face, but the technology department made sure the technology was there, so there were no issues, added Ms. Norman in her interview. “We teach our children to overcome small issues because that is the world we are in today,” said Ms. Norman. The principal spoke highly of the food service staff. This staff ensured the students were fed before dual enrollment courses and also for students traveling for career and tech courses away from their school campus.

### *College Courses and Responsibility*

Principal Norman spoke about why dual enrollment is important, “It is college-level thinking. I guess you can say. It gives a child a chance to see if that’s really the way they want to

go. Do they want to go to a four-year college, or do they want to go to a tech school? Which do you believe is better for you? It gives them an idea of thinking about their career and their future." Ms. Norman was proud of the job her students do and how they are pushing themselves to succeed in these dual enrollment courses.

Camp County had a liaison that was the connection between the high school and the higher education side of the setup for the students. Principal Norman added, "This is connecting the tech school, the university, or whichever one they attend. Having that liaison; that connection they are able to help the students make sure they (students) are following the expected criteria; it's very important." Prior research points to the positive effect that a college coach or liaison can have on high school students in dual enrollment courses.

Originally, Camp County had a college coach. The role formerly was more of a guide for the students. Ms. Thomas, who was in the district at the time but not an administrator, said, "Initially, we had a college coach. The person kept up with them, just helped them to kind of get used to college life, the assignments, things like that." The career development facilitator (CDF), is also now the liaison between the school and colleges. Thomas says that the coach position served the kids better with guidance about their graduation and career choices and goals. Ms. Norman spoke about the liaison's role, "it is more or less working with the students to make sure that they are doing their part." This role, in Norman's view, was to ensure the students did what they need to do to be successful.

Principal Norman on the role of CCHS teachers and staff, "We all work together to master the schedule to ensure that there is time for students to leave and go or come back to our main campus if they need to take another course. The various levels of leadership pull together to make this relationship work for the students. Angie Norman, "We have kids all over the place,

but our job is to serve those kids and give them the best we can give them under the circumstances."

Chief Academic Officer Laura Thomas closed by stating how the leaders strived to improve, "We're always reflecting on our programs and looking at our needs, not just as a school, but also as a community, just to ensure that we are meeting the needs of our community." Ms. Thomas wanted to continue to push for more. In closing, she stated, "I foresee us continuing what we're doing now and adding in some of the higher-level math and science courses through some type of partnership. We definitely want to continue to grow."

**Farming Valley High School**

Reeling from the changes surrounding Farming Valley School District (FVSD) and the apparent need to look for more educational options, leaders sought solutions. The district's Advanced Placement (AP) offerings began in 1989. Principal of Farming Valley High School (FVHS), James Edwards, said that the pilot year of dual enrollment was in 1998-1999, his senior year. Much has changed about the courses and the now dual enrollment program at FVHS. However, the need for leaders seeking unique solutions for rural students' advanced opportunities has not changed. Table 4.4 highlights the major themes found in the collected data and the evidence of these themes in Farming Valley High School.

***Table 4.4***

*Examples of findings in Farming Valley*

| Themes from data | Evidence |
|---|---|
| Cooperation | PVT and Farming Valley agreement<br>CEC problem solving among rural districts |
| Communication | CEC member discussions of possible solutions |

| | |
|---|---|
| | Farming Valley information for parents and families about the dual enrollment options<br>Farming Valley information and highlights of the program for the public |
| Community | Support due to communication has led to public support<br>Fourndation created to fund dual enrollment costs |
| Dual Enrollment | Options are increasing at FVHS with expanding opportunities with PVT<br>Options have begun with CSU promoting engineering and education |
| Logistics | Classes taught at PVT local campus creates transportation needs<br>Some classes not taught locally; over twenty minutes away is a transportation concern<br>Working together to find solutions includes the CDL certified Superintendent to drive students when needed |
| Responsibility | Colleges benefit from students familiarizing themselves with the rigor of courses<br>Liasions for students help navigate the experience<br>Free courses is increasing the need for entrance requirements |

### *Cooperation*

When Principal Edwards was in high school, the dual enrollment class was taught on the FVHS campus. Now, the dual enrollment program is taught on the Prairie View Tech (PVT) campus just outside of the town of Farming Valley. An agreement was made between PVT and the FVSD for a dual enrollment program.

Mr. Edwards mentioned the district's Central Educational Consortium (CEC) membership. "We are members of CEC, and I know there are always ongoing conversations surrounding the opportunities we can provide our kids, whether it be more AP opportunities or different avenues for dual enrollment," said Edwards. CEC is a consortium of mostly rural area districts that joined together for a larger political voice rivaling much larger single districts. The consortium also created similar job groups that met regularly to discuss common issues and possible solutions.

***Communication***

The ability to converse and get to know those in a similar position as you in rural areas is tough. CEC provided an avenue for rural leaders to help. Edwards spoke about the solution creator this group became, "Working together with all those different schools in our surrounding area, we're able to share ideas and…figure out different things. Things that we may have not thought about to be able to accommodate our kids or provide more opportunities for those kids." This type of think tank helped leaders in the CEC districts produce out of the box solutions that created more opportunities to learn for students in Farming Valley.

Communication about the dual enrollment program is key to student interest, parent involvement, and community support. Mr. Edwards spoke about this component of dual enrollment success in Farming Valley, "We always try to keep our community stakeholders involved, as far as keeping parents informed. We've had several parent seminars." The communication did not end with this, but Edwards also brought PVT in so parents could hear from the college what the school district and the technical college were potentially offering the students. The communication from the partners was to ensure that parents and other stakeholders were informed of the available opportunities. In rural areas, communication is important to build or keep community support.

### *Community*

The Farming Valley community was very supportive of the school system. Principal Edwards stated, "Our community really gets behind the opportunities for our kids to pursue college and AP classes." Community support was important, and Mr. Edwards shared that Farming Valley residents started a privately run educational foundation that paid tuition and fees for every Farming Valley High student who wanted to go to PVT. This was different than the school board financial support in Camp County but the result was that students in both districts do not have to pay for their dual enrollment pursuits.

Parents and families were very appreciative of the dual enrollment program. In Farming Valley, students having two years of college coursework behind them was great for students and also financially for their families. Principal Edwards admitted that he would have enjoyed having the opportunities that his students have today with their dual enrollment work.

### *Dual Enrollment*

Dual enrollment classes at FVHS were not always free for students. About half of the kids at Farming Valley could afford the courses. With the support of the foundation the burden of paying tuition and fees associated with dual enrollment was taken away from the student.

The principal did feel strongly about dual enrollment, "I think it's super important. It gives a lot of our kids the opportunity to get a head start in taking college courses. It also adds a lot of rigor and challenges to our curriculum that some of our high-flying kids need."

Through FVHS and PVT, Mr. Edwards told me students could take introductory English 101 and 102, Prob Stats. Also, there were advanced history classes, and students could take dual enrollment biology and chemistry. Principal Edwards explained to me they are ever expanding the scope of the program. For example, Central Savannah University (CSU) partnered with FVHS to offer two options for students. Mr. Edwards explained, "We even have a mechatronics

program where they can take some engineering classes. Students taking introductory classes through PVT or CSU can use those to start in the college of education at CSU as juniors." Speaking a bit more in depth on these points, Edwards shared that in the engineering program, students could start at CSU or another state university, typically as juniors, and begin work in their major.

***Logistics and Location***

When Principal Edwards was a student, he mentioned that classes were taught on the FVHS campus. Dual enrollment has been taught at the local PVT facility by PVT professors. Dual enrollment classes have been off the FVHS campus for 10-12 years. This did present some logistical adjustments for FVHS. The administration showed great flexibility to accommodate the students who left to take courses off campus. "We have to build our schedule in a way that allows for that flexibility," Edwards descibed to me.

The PVT campus in Farming Valley was small. Principal Edwards said that "Since we're so rural, the small campus may not offer a class that a student wants to take. So, the student may end up having to drive either Greenview or Blueberry, some twenty miles away to another campus. This creates scheduling issues, but we make it work."

Locally, bus transportation was provided for students who needed a ride to PVT. Even Dr. Vining, the district superintendent had driven a bus for students to PVT for classes on days when drivers were out Mr. Edwards mentioned. To provide transportation and other needs for affected students outside of the cost of a course, the district used some Title 1 funding since the district had a high percentage of students living in poverty, Mr. Edwards added.

***College Courses and Responsibility***

Students in FVHS that took dual enrollment and AP, "the kids on that track, they own it. The school and district leaders ensured that the students and families knew the advantage of the

five-point scale. The five-point scale GPA gave FVHS students an opportunity to be top ten in a class for those who aspired to win scholarships, said, Edwards. The colleges also had a stake in offering dual enrollment too. Mr. Edwards pointed out that his experiences with CEC colleagues and the colleges was a good outreach for the colleges as they could familiarize themselves with the communities and students. The rigor-seeking students were steered through their dual enrollment pursuits toward higher education options.

I asked Mr. Edwards about any liaison-type persons. He pointed out, "Our director of guidance has formed a really strong partnership with the local technical college. The director plays the liaison role between our school staff, PVT, myself, and our chief academic officer at the district level." FVHS still had an AP program in place, to some extent. The assistant principal for instruction (API) was directly involved in making sure that the school offered the AP classes that kids desired. Somewhat similar to the director of guidance liaison role; the role of the API was to work with the College Board to provide needed curriculums for AP courses.

With the no-cost classes, Edwards reported there were still issues to resolve, "there is not necessarily a prerequisite on who can decide to take a dual enrollment class or not. Some of our middle-of-the-pack or below-average kids have struggled when they took some of these classes." Farming Valley High leadership discussed establishing a criteria for entry into classes. That was not a problem until recently when it became a free college.

Principal Edwards saw the demand for dual enrollment take off in recent years, which affected AP course demand. "We do have a small population of kids that want to take AP classes. Our biggest roadblock is that we don't have enough kids to make the class. It becomes too expensive to have one or two kids and have a single teacher set aside for that one class," stated Edwards.

On the dual enrollment program and other pathways, “We want to continue to grow it, and part of that growth is also looking at career and technology pathways. The ultimate goal is to have a technical college career center nearby. (We want) to not only provide the academic and higher education to move onto a different college but also be able to produce skilled laborers.” The tie to the area’s manufacturing and farming past was still very strong.

**Future Pathways**

From the interviews I conducted in this research, the leaders felt sure that the AP route was not a great fit for many rural areas due to the lack of available and qualified staff and low student demand. In Camp County, the availability of staff to teach AP was an issue. In Farming Valley, staffing was not the issue, but the student demand for the courses continued to wane. Mr. Edwards quipped with me, “If we came back in five or ten years I wonder if we will offer any AP.” Combining this with the almost ubiquitous rural problem of retaining highly qualified teachers for AP or dual enrollment courses continues to cause angst among some rural leaders like these in Camp County and Farming Valley School Districts.

Though not the focus of my study, schools such as Camp County in my study also partnered with a neighboring district and PVT for career and technical educational (CTE) programs. Many of these programs led to certifications for their students upon graduation. A student with a certification could go to work in a field immediately after high school.

Farming Valley also partnered with a neighboring district for welding and health science CTE programs. Combined district programs like this are critical for getting job certifications to all students in rural South Carolina and other areas. The two districts in my study spoke about their cooperative CTE programs as an emerging avenue for career-focused students.

***Rural School Leadership and CLT***

Rural school leaders in Farming Valley and Camp County schools realized that their

students needed more opportunities to compete in a modern and worldwide economy. The students in these schools had some AP options, but the classes were less in demand. Principal Edwards admitted that Farming Valley could not offer specific advanced courses if the student demand was low and the school faced staffing shortages.

Principal Norman added that Camp County High was facing a shortage of teachers, particularly in math and science, like much of South Carolina. This strain caused these classes to be larger and less personal. These points were similar to the findings of the early referenced studies of Morton et al. (2018) and Saw and Agger (2021). The teachers in these traditional college prep track courses already taught more students per class and filled in more extracurricular roles due to the mentioned shortage. The schools could not add more courses to the teachers they had. Dual enrollment was an avenue that could provide more rigorous academic offerings to motivated students.

The communities of Farming Valley and Camp County took notice of the effort and the advantages of increased opportunities for their students. In Farming Valley the community gained interest and finances to pay for dual enrollment. This effort was rewarded due to good communication of what students here could achieve with support.

Camp County Principal Norman stated that her son and niece took advantage of dual enrollment at CCHS. It allowed them to see what learning was like with professors and the academic level of the college work. It did lead to a need for more maturity, and this was apparent when students had to keep up with the college workload. In Camp County High, students had to reach specific requirements and not enter until the summer before the eleventh-grade year. Some courses were distance learning due to logistics that sometimes prevented face-to-face instruction. “They have a professor on the screen, so they must be more responsible and keep up with their

assignments." However, the benefits seemed to outweigh the potential drawbacks in these cases. "Overall, a conservative conclusion here is that distance learning offers promise in cases where face-to-face instruction is not feasible" (Gagnon & Mattingly, 2016, p. 280).

With the cost of college growing almost yearly, dual enrollment courses provided economic help to parents by taking college-level courses in the high school years. These courses still had associated costs, but where the need was, and the opportunity presented itself to meet the need. The school leaders and the community worked to ensure that the cost of attendance would not hinder dual enrollment for their students. Camp County High and Farming Valley High had the cost of the PVT courses covered by their school boards. Farming Valley also had an educational foundation to offset costs. Both districts found Title 1 funding to support these dual enrollment efforts so that the students paid nothing out of pocket.

***Effective Leadership***

With a staff member having to teach an AP course, these rural South Carolina school districts had the unenviable problem of increased class numbers for non-AP students in other courses due to staffing. It is the concept of opportunity cost, where a teacher in an AP course cannot simultaneously teach other courses for their department. The leadership in these schools faced the philosophical dilemma of filling low-demand AP courses with unprepared students or not having an AP math or science course for students who were ready for a challenge.

The need was met when Prairie View Technical College (PVT) augmented the academic program in Camp County. PVT's professors teach college-level courses through a memorandum of agreement with Camp County. The classes are taught off-site at the Camp County PVT campus. This arrangement has provided a boost for motivated dual enrollment students, while the non-accelerated student and their teachers have smaller class sizes back on campus. As Camp County Schools, chief academic officer, Laura Thomas, stated, the agreement has been a

godsend for their students and community. Ms. Thomas had sons who also participated in the dual enrollment program at Camp County High. She was not in administration at the time but admitted that while initially hesitant, she realized the encouragement it was for her child to take dual enrollment courses and then the economic savings of dual enrollment when her student could begin his major coursework in his first year in college.

***Rural Leadership***

CLT fits the rural actuality of leadership, where a leader serves many roles. This theory does not have to eliminate a traditional individual leader or a leadership team from where some people assume directives and solutions to problems in an organization flow (Lichtenstein et al., 2006; Regine & Lewin, 2000; Uhl-Bien & Marion, 2009). In educational systems, the application of CLT is less of a homogenizer. The leader does not disappear, but influential school leaders braid themselves or cynefin into the context of their school and community to the point of being inseparable from each other (Snowden & Boone, 2007). Leaders can and typically do come from varied sources in small rural schools. Camp County and Farming Valley are no exceptions. Principal Norman on leadership, "Administrators are not the only leaders, no way. Listen, you can only lead. A leader is only as good as the people that they serve." The feeling is that in these two districts, everyone is working to help. Norman added, "We serve the people. We serve our teachers. We serve our students. But we are developing teacher leaders. The idea is to ensure that what we built will continue when we leave." So, in CCHS, the leaders, when enabled or charged to help, can be the superintendent, school administrator, counselor, and teacher.

"I don't think necessarily our leaders have to have a title. Many leaders emerge. I have teachers who assume leadership roles. It just depends on the situation. I look for people with certain skills, and I think that's a kind of philosophy of our district," expressed James Edwards.

Just as in Camp County, Farming Valley leaders understand rural leadership. Mr. Edwards concluded, “Our superintendent, Dr. Vining, may be the most servant leader I’ve ever been around. He builds capacity in a lot of people, and so we just kind of try to take that and reciprocate it and pass it along to our people. “ Mr. Edwards described the leadership in FVHS as a lot of shared leadership. “It just kind of depends on who emerges in that situation, and that has been a good model for us,” Edwards concluded.

The school leader needs to understand the school’s context and the adaptive process to enable the system so ideas emerge (Uhl-Bien & Marion, 2009). People need to feel they have input and voice. Pressure to innovate and create solutions for problems is removed from the singular voice of the formal leader (Lichtenstein et al., 2006) in CLT. In Camp County and Farming Valley, school leaders had other leaders step up to solve logistical issues. The communities came forward to remove the cost factor related to college courses so that students could test the advanced courses for themselves without financial obligation.

**Conclusion**

In my study, I found that leaders in each school worked to find ways to provide their students with more OTL than rural schools have had recently. The principals in these two schools were the official leaders, but both pointed out in interviews that providing more for students in their rural schools was a cooperative effort. In addition to this, getting the word out about the dual enrollment programs at both locations had drawn parents and students into wanting more information and participation. The communities responded with financial support as well.

Dual enrollment at both schools continued to grow. At Camp County, this growth and the guarantee of college credit with a passing mark effectively ended desire for AP courses CCHS

had in the past. At Farming Valley, the AP course was still viable, but, as Principal Edwards pointed out, it had been in decline.

This research study aimed to determine how rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses. In this exploratory multiple-site case study, I interviewed two principals of rural South Carolina High Schools and other officials with insight that could further assist in answering the research question. I used a semi-structured interview protocol to gather qualitative data. I found that these two rural districts have school leaders and other officials who allow students to learn and gain college credit through dual enrollment in their community. Dual enrollment also gives confidence to academically ready rural students so they can be successful in a college setting while raising the bar of expectations for the school community.

These findings are significant because more qualitative data was needed on rural schools and advanced course offerings where resources were already in short supply. By using complexity leadership theory (CLT), I made sense of how effective leaders in these rural schools enable adaptation. In Table 4.5, I synthesize how rural school leaders use the tenets of Complexity Leadership Theory to solve the question of how can a small rural high school in South Carolina provide more opportunities to learn for students in their schools. These leaders were tacticians who, to be effective, had to braid themselves into the fabric of their communities. This was for job satisfaction in these particular rural communities. These leaders in these locations were examples of how rural leaders need to know the context of their community and the web of community needs and wants. These leaders must simultaneously be communicative and approachable by the community while managing the mandates of modern education.

***Table 4.5***

*Examples of Complexity Leadership Tenets*

| Administrative Leadership | Enabling Leadership | Adaptive Leadership |
|---|---|---|
| Rural districts and schools have a flat hierarchy of formal leaders | Leaders have to enable those who may not have official titles to find solutions | CLT in rural schools explains solutions or adaptations by the formal and informal leaders working to produce results |
| The effective leaders in my study repeated the terms serve and servant leadership as a requirement | Leaders give voice and input to others, creating shared leadership | Leaders emerge depending on the task presented and the amount they are enabled to adapt the system for change |
| Effective formal leaders in rural schools are aware of the framework and regulations of their systems from the state and local government | Enabled staff vets ideas and solutions to find what will be acceptable to regulations | Emerging and formal leaders enabled to seek solutions are free to think and provide ideas to be tried by the enabling leadership. |
| Rural school leaders have to be aware of their community's wants and needs from the public school system | Enabled by the school board and upper administration, enabling leaders look to an adaptation to provide more OTL or other solutions | Adaptive leaders take the enabled ingredients and parameters to form solutions to provide more OTL for rural students or other issues |

| | |
|---|---|
| | recognized by the Administrative Leadership tenet through the Enabling Leadership tenet of CLT |

In the following chapter, I further discuss how these findings suggest the need for more rural education support from local, state, and national leaders. In the next chapter, I also offer recommendations for future research. I point out the significance of the findings, and I note recommendations based on my interpretation of the qualitative data. This study's limitations are mentioned and topics for future research are suggested before the final conclusion.

# CHAPTER 5

## DISCUSSION OF FINDINGS

My investigation was a qualitative exploratory multiple-site case study of two rural South Carolina high schools. These schools offered their students advanced courses and programs through dual enrollment arrangements with the regional technical college. Farming Valley High (FVHS) and Camp County High (CCHS) had also begun partnerships with different four-year universities. These partnerships were designed to help high school students take required coursework to be prepared for engineering and preferred science programs when they entered those universities.

To achieve successful implementation of advanced OTL in these rural high schools leaders had to build trust in the leadership and provide good communication. This process led to cooperation and support from the community. Logistical support among local leaders ensured that students were in the courses they needed, were fed, and had adequate transportation to their class site. Complexity leadership theory can be used to explain these findings. In this theory, formal adminstrative leaders provide structure and enable other leaders to seek solutions to problems such as providing more OTL from a ground up approach. In the following chapter these findings are discussed.

I paired the deductive codes from the interviews into themes and combined the themes into larger themes. Under the big theme “Cooperation” in Camp County and Farming Valley, I found cooperation, communication, parents, community, logistics, location, and staff. “Dual Enrollment” was another big theme. Under this theme were the sub-themes dual enrollment, colleges, liaison, requirements, and responsibility.

Using some key themes and ideas from this data, I will discuss the main findings. In the

similarities section, I explain what I found in Camp Creek and Farming Valley data. Specifically, I analyze how the leaders in these areas used the mentioned themes to help increase the OTL in advanced courses in their schools. Following the similarities, I point out the diversions from each other in their approaches to offering advanced courses. In the next section, I analyze the theoretical framework of CLT as it applies to my case study of rural education leadership.

**Similarities in Findings**

More qualitative insight was needed into how rural school leaders created or continued to create more OTL advanced math and science courses (Kolluri, 2018; Schafft, 2016) in rural South Carolina High Schools. Part of my study examined how some school leaders effectively managed the context of the school in the community (Klar & Huggins, 2020) and its place, belonging, or entanglement with these rural communities (Bauch, 2001; Budge, 2006; Biddle, 2021). This work furthered the knowledge base surrounding the problem while providing qualitative insights. I focused on the leadership process in selected rural South Carolina high schools to answer the following research question: How do rural South Carolina high school leaders provide their students opportunities to learn in AP or dual enrollment math and science courses?

**Community**

In rural settings, the rurality does not stop at the schoolhouse door. It walks inside with the students and their families. It is built into the area's history, for better or worse. My experience has proven that school leaders can accept that and use it to the school's benefit or fight it and have less community support. In their study of rural southern schools, Sutherland et al. (2022) found that administrators in rural settings have to use bonding capital if they are from the area or bridging capital if they are considered outsiders. This study affirmed what I found

through interviews with school leaders: the community trusts the leaders' intentions after trust-building acts (Sutherland et al., 2022), such as providing students with more opportunities to learn through advanced courses. This trust-building occurred even as the administrators in this study were members of their communities and one outsider from a similar rural area. Therefore, they did not require the amount of bonding or bridging capital for the latter.

As Farming Valley and Camp County communities are in an era of shifting demographics, culture, and business, the school leaders have built trust with their families and community members. One way is through the advanced opportunities for their students in dual enrollment and the evolving nature of these types of programs in these districts going forward. These Farming Valley and Camp County changes are now embraced and sponsored by community members (Sutherland et al., 2022). The small enrollment in some rural South Carolina schools does not have to mean limits in education as long as formal school leaders enable the system's adaptation to create solutions and opportunities.

**Partnerships**

In South Carolina, the selected districts in my study found a desire or need for the regional technical college, Prairie View Technical College (PVT), to increase its student enrollment. The rural school districts were having trouble offering their students advanced courses. This issue was highlighted in Saw and Agger's (2021) work, where they found that rural students often do not have advanced options in STEM courses. The two educational systems formed a mutual symbiotic relationship. PVT provided advanced courses to these rural high school students while providing a college-level experience to them. Under this agreement, the high school students were exposed to college-level work taught by college professors.

In my study, I found that these rural districts, Farming Valley SD and Camp County

schools, provided OTL by partnering with the nearby technical college to provide their rural students opportunities to take college courses from college professors on the Prairie Technical College satellite campuses. Camp County Schools has partnered with Greenview University in the nearest city, thirty-five minutes away by car, to provide more advanced science courses, which began with the 2023-2024 school year. This continuing search for more advanced opportunities boosts the students' future opportunities and options.

Farming Valley principal Edwards offered that the district has partnered with Central Savannah University to help rural students get a head start on a career in teaching or engineering. These partnerships touched on several factors that contribute to less rural college-going and completion. Most salient is that with advanced coursework in their rural high school, these students have less financial burden and subsequent debt with college attributed to their preliminary coursework completed while still in high school. Principal Edwards stated it is a significant advantage for their students to go into earning their degree having attained most of their elective or pre-requisite courses. These districts and their cooperating college partners have ensured that many of these dual enrollment students have an opportunity to do college-level work. This idea of more college-level offerings in rural areas is more in line with a study by Wells et al. (2019) that looked at changes since the 1990s in rural college going and attainment; it noted that rural students have closed the gap but that more rural students are likely to achieve certifications and associate level degrees than their suburban and urban peers. If students have more opportunities to take college-level courses, they may gain confidence in their abilities, as Camp County Principal Norman stated had been happening to some of their community's students in dual enrollment.

**Logistics**

Another major issue both Camp County and Farming Valley School districts address is that many rural students lack the proximity to a college to attempt to further their academics. Past studies acknowledge several factors as to why rural students are less likely to achieve a bachelor's degree, but one that is interesting is the distance from a college for rural students (Schafft, 2017). My research found that Farming Valley SD and Camp County School students are thirty minutes from the nearest college campus.

Transportation was addressed, and the districts provided transportation to the local PVT campus as needed. Mr. Edwards stated the district had offered transportation in Farming Valley, but travel to a PVT in another town twenty-five minutes away was an issue. Ms. Thomas stated that Camp County will run a bus for one student if that is what it takes to give them a chance to take a course they need. Both districts admitted that transportation must be addressed, but their transportation departments made it work for the students at the time.

**Support**

In rural education, several researchers suggest a connection between rural community members and their schools (Azano & Biddle, 2019; Biddle & Azano, 2016; Budge, 2006; Preston & Barnes, 2017; Snowden & Boone, 2007). To institute change and get buy-in from the community in a rural area, the school leaders must have positive working relationships established with key community members. These relationships are where positive social buy-in, positive bridging, and bonding capital (Bauch, 2001; Sutherland et al., 2022; Tieken, 2017)) could play a factor in converting these elements through adaptive leadership into intellectual capital for rural schools (Uhl-Bien & Marion, 2009). The rural community extends beyond the schoolhouse door (Azano & Biddle, 2019), and the rural place extends inward beyond the

schoolhouse door. Place matters to many rural persons (McHenry-Sorber, 2021). As administrators can offer more opportunities to their rural students, an examination of the pathway to expanded OTL in these areas should occur.

The school and district officials complimented the local school boards in this study for their support in enabling the education system to change how things have always been done. These boards and a local educational foundation allowed students in these two school districts to take a college course or courses of study without paying out of pocket. This point empowered these rural students, whom research has found are less likely than non-rural peers to have access to advanced courses and preparation (Saw & Agger, 2021). Rural high school graduates are less likely, but the gap has narrowed, to enroll in or complete a bachelor's degree program than their non-rural peers (Wells et al., 2019). There is an increasing need in some rural areas to have four-year degrees in some fields that have not been required until recently (Saw & Agger, 2021). With this research in mind, I conclude that local school boards and community members should encourage and support school leaders in securing agreements to offer advanced courses and even technical certification programs to rural students.

**Diversion**

South Carolina State Board of Education Regulation 43-258.1: Advanced Placement requires that each school with an 11$^{th}$ and 12$^{th}$ grade offers at least one AP course. I hypothesized that AP courses would be prevalent or at least plentiful at Farming Valley and Camp County. However, I found that the opposite is true. AP courses were minimal and relegated to subjects other than math and science at FVHS. In Camp County, no student was taking an AP course. Students reported to their administrative teams that the prospect of gaining college credit for the body of work in a dual enrollment course appealed to them more than the high-stakes testing

score needed to get college credit for an AP course. Dual enrollment seemed better to fit these districts and their students' situation.

**Complexity Leadership Theory**

The overarching theory behind this study is complexity leadership theory. This theory makes sense of operations in smaller rural schools, as the two schools in this study prove. The use of CLT by principals and other leaders in my research fits the three central tenets of Complexity Leadership Theory: administrative function, enabling function, and adaptive function. These rural school leaders are administrative taskmasters, enabling the system to change and encourage adaptation for their rural students and communities.

The administrative leadership function provides the parameters or boundaries, as explained by Marion and Uhl-Bien (2009) and other leading thinkers in CLT. This function is what most people think of when they think of a "traditional leader" with some singular person or a small team leading the way. This is typically referred to as top-down leadership.

The adaptive leadership function of CLT is to find more efficient ways to get a job done. For the educational purposes of this study, this function may be formally titled leaders, teachers, or classified staff working ideas out. This process is the cauldron of experimentation when solutions are tried in theory or reality. The superfluous parts of a solution are boiled off, and more palatable ideas are passed through the enabling function to the administrative function.

The enabling function is where traditional leaders enable the system to work out solutions. Enabling occurs when confident leaders release or enable the system to find a solution to a problem. Solutions arise from the adaptive function. Then, the enabling function takes viable ideas and works to formalize the new solutions through the administrative function. Figure 5.1 is a visual representation of how CLT, in small complex systems such as small rural schools, has

overlapping functions, just like there are overlapping formal roles and titles in these areas.


***Figure 5.1. Complexity Leadership Theory Components***

**Rural Districts, Complex Environments**

Complexity science is not a new idea, but it is a field that has been applied chiefly to management in the past (Regine & Lewin, 2000). Turner and Baker (2019) theorized that complexity science should be expanded into the social sciences to put fields such as leadership into position to use better the modern complexities "associated with advancing technology, globalization, intricate markets, cultural change, and the myriad of challenges and opportunities to come" (p. 1) and specifically identified as one of the ways complexity science needed to grow was in the field of leadership. The use of complexity leadership theory in my study of rural education leadership was needed, particularly considering today's student needs and rural community contexts. Rural settings are complex environments where leaders, stakeholders, and community members would all be considered agents.

Organizations that embrace complexity science are organizationally flat, with fewer hierarchy levels, and promote open communication and diversity (Regine & Lewin, 2000). In rural school systems, there are fewer singular role positions of leadership. Many administrators serve in multiple roles, and teaching staff also may serve the district in formal and informal leadership roles. These characteristics increase a system's capacity to adapt (Regine & Lewin, 2000). This adaptation can create innovation and solutions. The education field is where complexity leadership theory (CLT) can help in sensemaking. CLT can assist in explaining created solutions in a rural district or district in this study; similarly situated systems can then use

or adapt these ideas to solve their unique problems.

In my literature review, I found that complex networks or systems change because agents in the network gain insight, interact, or work together (Uhl-Bien & Marion, 2009). Complex systems are dynamic and adaptable. They are composed of diverse actors or agents interacting with and mutually influencing each other. As such, these agents can meet changing conditions by generating novel behaviors and outcomes (Regine & Lewin, 2000). When a complex system encounters a solution that failed or has not been as efficient as anticipated, (Long et al., 2019), the system and its people do not forget the adaptation, but everyone learns from the effort.

Education leaders are agents and, as such, fit the role of agents in CLT. The interactions change the agents with exposure to and possible formulation of new ideas, potential solutions for common issues, and interactions within the local social context surrounding the system. Leaders in rural schools are adaptive to the needs of the stakeholders while possessing ideas of what their students need to face the interconnected global world we live in today.

Rural school systems, in their context, are complex. Snowden and Boone (2007) make the case that complex systems are not linear in decision-making or logical due to the unpredictability of human nature. Once change happens in the system, the adaptations and evolution of a complex system are irreversible (Snowden & Boone, 2007). Even if the change was unsuccessful, the complex system does not ignore the information it learned. Nevertheless, another adaptation or adjustment may occur that is more successful.

Complex systems learn and adapt or evolve in response to interactions of agents within the system but also due to interactions with other similar systems (Cilliers, 2002; Marion & Gonzales, 2014; Uhl-Bien & Marion, 2009). Farming Valley and Camp County School Districts are in a consortium of similar rural school districts that form the Central Education Consortium

(CEC). This group was originally formed to provide a larger voice for the state's more rural areas in the West. This group has good relationships with policymakers and lawmakers in the South Carolina General Assembly.

An effective by-product of this consortium has been the cross-district collaboration that has taken place over the years. Many persons in similar positions in these districts meet regularly and work on solutions brought before the group. The senior leadership in the CEC districts, the superintendents, and the school boards of each district enabled this type of collaboration. These positions comprise the formal administrative leadership in these schools and districts. Through CEC, the varied districts' central office staffs of the consortia committed to collaborating with the other districts, principals, and regional officials.

Initially, the adaptive ideas coming from this consortium were pooling financial resources, fine-tuning curriculums, and finding more efficient ways to operate transportation departments and work among other non-certified areas. The result of these interactions and the changing environment inside and outside the organization, on the local level and in the CEC region, caused adaptation and evolution.

**Recommendations**

Small rural districts in South Carolina need to expand the implementation of dual enrollment programs of study. South Carolina has a strong technical college system with regional campuses spread throughout the counties. Partnerships in conjunction with the state's technical college system and with cooperating colleges or universities in the state are keys to expanding opportunities for rural students. Using more dual enrollment courses in high schools could benefit traditional four-year colleges and universities as high school graduates may be more

focused on their desired major. This shift will increase the need for more specific classes in programs of study.

### *Policy Revisions*

Policy revisions at the state level should include recognition of and assistance to school districts that have made advanced courses through dual enrollment available to their students. These schools often use a coordinator or a liaison position to assist students in managing social, mental, and academic expectations of leaping to college-level work in high school. With confirmations from both Farming Valley School High School and Camp County School High School's principals, these schools have tasked a counselor, administrator, or other engaged faculty leaders as a liaison and coordinator to support students but also to ensure good communication and expectations are conducted between the high school and the cooperating technical colleges, colleges or universities. I recommend adding a per-pupil funding item to the state secondary education budget to assist with a stipend for rural high schools willing to find these solutions for their students. The benefits of this change may result in better-acclimated rural students who better understand their abilities and will be more able to navigate their post-K-12 experience.

## Limitations

As a qualitative exploratory multiple-site case study, the findings in my study may be transferable to other rural area schools. However, the ideas and solutions are not generalizable due to my case study's sample size of two similarly situated schools in one state in the southeastern United States. As an educator in public schools in South Carolina, and through extensive personal study, I further recognize and acknowledge that variations are inherent in each community. These variations and differences among communities may render any solution in my study inapplicable as these may not be generalizable.

**Recommendations for Future Research**

Future studies of advanced course opportunities for rural students are needed. There is a need to study how dual enrollment programs within small traditional high schools impact the social aspects, discipline, transportation, extra-curricular activities, and other parts of rural high schools. These dual enrollment programs can potentially remove the more driven students from the traditional setting. The positive side is that students in traditional college prep courses can meet their needs due to lower class sizes.

Future studies regarding CLT in education and other professions could expand how people view leadership. In my study and thoughts on how people interact within the context of their environment, I believe CLT is how we learn and adapt to the people and scenarios in which we are surrounded. The study of CLT and how leaders who are enabled with the freedom to adapt can change how things have always been and how they can change the status quo should be studied. Empowered leaders can create solutions. These solutions are refined through trial to become policy for the benefit of a school, district, region, state, and eventually, perhaps the field of education.

The study of and the ideas of education have not changed much over the past 125 years. Hesitation regarding operational change in education has led to complacency in some areas. That can be a problem when the world is changing faster than ever. Complacency gives birth to contentment. Contentment leads to stagnant ideas regarding education in a modern knowledge society that is expanding exponentially. I believe further research on CLT needs to be implemented in education studies and studies of other social sciences. A broad study over a state or region using mixed methods could yield more data on how CLT helps sensemaking and problem-solving.

## Conclusion

My research was based on the types of places and the people that have made me. I chose to do a qualitative exploratory multiple-site case study in two rural South Carolina high schools away from the suburban sprawl that seems to gnaw away both the good and bad of the state I love. I intended to shine a light on how rural leaders solved problems where policy, funding, and government support had not caught up with the needs of the people. What I learned in my research was that people invested in systems that are a big part of their community, such as the local school, will find logistical solutions. Hence, students have opportunities to study in ways unimagined just a few years ago. I hope that this adaptive, evolving effort does not stop so that more solutions for rural students and students everywhere are discovered.

# APPENDICES

## Appendix A: Literature Review Organizational Chart

How do rural high school leaders provide students with opportunities to learn advanced science and math?

| **Challenges in Offering OTL in Rural Schools**<br><br>**(Heading)** | What does the research say? | Implications? Practice & Future Research |
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| Life on the Frontier of AP Expansion: Can Schools in Less-Resourced Communities Successfully Implement Advanced Placement Science Courses? Mark C. Long, Dylan Conger 2, and Raymond McGhee Jr. | • Challenges were planning time<br>• Not enough support from district school.<br>• Aligns with report of large schools with high free/reduced have lower levels of support and encouragement from admin 362<br>• STUDENT SUPPORT<br>• Scaffolding material; modifications of online content; assignments at home to discuss and clarify in class | Practice:<br><br>Future Research: |
| Carriveau, L. G. (2021). *An Equity Analysis of a Central Texas Community College Dual Credit Program* (Doctoral dissertation, Tarleton State University). | • Challenge- online grades lower<br>• Need- a support system for online learning<br>• An (2013) advanced this concept by advocating for policies and practices specifically directed to the support of low-income and minority dual credit students in lieu of | Practice:<br><br>Future Research: |

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| | simply expanding access to dual credit programs<br>• Support-in person DC courses needed, when not able then improving support for online instruction | |
| Tennessee Department of Education. (2017b). Statewide dual credit: Implementation overview. https://www.tn.gov/content/dam/tn/education/ccte/eps/eps_sdc_implementation_guide.pdf | • No mention of support<br>• Prior academic achievement is a gate keeper to get into advanced coursework | Practice:<br><br>Future Research: |
| **Poverty in Rural Schools**<br><br>**(subheading)** | • *This column can organize specific info from research*<br>• *(add important finds in bullet form as quotes with author/date)*<br>• *If you do this for each topic, you can use this to organize your writing* | |
| Gagnon, D. J., & Mattingly, M. J. (2016). Advanced placement and rural schools: Access, success, and exploring alternatives. *Journal of Advanced Academics*, *27*(4), 266-284. | • (Definition of dual enrollment): Dual enrollment (sometimes known as early college) enables high school students to take class at local colleges and earn college credit if successful. Unlike AP, dual enrollment entails taking actual college classes, with syllabi and | Practice:<br>AP offered in high minoritized pop schools more often across all urbanicity codes<br>ONLY 51.4% of rural schools enroll **one** student in AP courses<br>Lack of access threat to equity due to not being |

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| (Continued from the previous page)<br><br>Gagnon, D. J., & Mattingly, M. J. (2016). Advanced placement and rural schools: Access, success, and exploring alternatives. *Journal of Advanced Academics*, *27*(4), 266-284. | credit criteria set by the college 279<br><br>• avg analysis shows that for a suburban school district of average poverty, not having low enrollment, and not in the highest quartile of minority students, we estimate a 93% chance of offering AP coursework. This contrasts considerably for the estimate of a remote, poor rural district of low enrollment: a mere 14%." P.273<br><br>• suburban districts have 6.3 times the odds of rural districts of offering an AP class, controlling for low-enrollment status p.272<br><br>• surprising is the estimated effect of high-minority status; descriptive analyses not shown here suggest that high-minority districts have AP access rates equal to or greater than non-high-minority districts in all urbanicity categories p. 272<br><br>• Only 51.4% of rural school districts enroll at least one student in an AP course, compared with 78.3%, 93.8%, and 97.3% of town, | able to prove you can do college work<br><br>AP/DE synonymous with rigor. Schools w/o should explore all options.<br><br>Online not a replacement for face to face where engagement is key<br><br>Small schools less likely to offer varied advanced courses<br><br>Future Research:<br><br>We find that rural school districts are much less likely to offer any AP courses, especially when a rural district is small, remote, and/or poor. These findings clearly have worrisome implications regarding equal access to educational opportunity, as many gifted rural students cannot use AP to experience college-level coursework, earn college credit while in high school, or develop an advantage in the selective admissions process. 278 |

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| | suburban, and urban districts, respectively. 272<br>• For gifted students in rural schools, a lack of AP coursework offerings would present a significant threat to equal opportunity given they could not demonstrate this college-readiness in the same manner as their more urban peers. 267<br>• Districts of very low enrollment face acute challenges to offering AP due to staff size, with many teachers being likely to instruct multiple subjects. When examining AP enrollment and success across U.S. school districts, we examine only those districts that offer at least one AP course. 271<br>Furthermore, some rural districts that are unsuitable for AP programs may also lack a nearby tertiary institution with which to establish a dual enrollment program. 279 | Many rural districts may deem AP programs unsuitable to their context due to insufficient numbers of capable students, lack of appropriate teacher staffing, and/or other logistical concerns owing to small, isolated populations. 278<br>Suburban highest success. More courses more chance at success<br>Rural; poverty; low enrollment severe challenges due to 'staff size-likely instructing multiple subjects' |
| Irvin, M. J., Byun, S. Y., Meece, J. L., Farmer, T. W., & Hutchins, B. C. (2012). Educational barriers of rural youth: Relation of individual and contextual difference | • Support is needed to help rural youth, particularly those from more rural, high poverty areas overcome perceived barriers | Practice:<br>Future Research:<br>Identify variables that may predict causal |

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| variables. *Journal of career assessment*, *20*(1), 71-87. | | relationships of barriers = targeted intervention/prevention |
| Howley, A., Howley, M. D., Howley, C. B., & Duncan, T. (2013). Early college and dual enrollment challenges: Inroads and impediments to access. *Journal of Advanced Academics*, *24*(2), 77-107.<br><br>Points out in findings that many respondents mentioned that these kids have a chance due to the advanced courses.<br><br>Study included rural area/consortium | • participating programs call "underprepared" students presents a substantial challenge because the early college or dual enrollment arrangement must somehow cultivate preparedness for college-level work while requiring "underprepared" students to perform such work adequately. P83<br><br>• "the discourse has shifted from academic excellence to academic equity." P. 81<br><br>• Opens doors for middle tier and impoverished students | Practice:<br><br>Future Research: |
| Kolluri, S. (2018). Advanced Placement: The dual challenge of equal access and effectiveness. *Review of Educational Research*, *88*(5), 671-711. | • "Schools in low-income neighborhoods have been assailed for their unsuccessful AP programs and schools in middle- and high-income neighborhoods have been shown to marginalize students from nondominant cultural backgrounds. While the research on diverse schools is methodologically robust, including a variety of case study and ethno-graphic | Practice:<br><br>Future Research: |

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| | investigations, similar studies into low-income AP programs are largely absent from existing literature." Much available evidence suggests that AP has not yet achieved its stated goals of equal access and effectiveness. Arguing that a policy has not succeeded, how-ever, is distinct from arguing that it can never succeed. 703 AP has expanded access, smaller percentages of students have passed tests, and AP participation has become more weakly associated with college persistence 704 | |
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| **Teacher Experience/Teaching Out of Area in Rural Schools**<br><br>**(subheading)** | • You are already addressing some of these in what you were writing, just be sure you are direct with the literature | Practice:<br><br>Future Research: |
| Biddle, C., & Azano, A. P. (2016). Constructing and Reconstructing the "Rural School Problem": A Century of Rural Education Research. *Review of Research in Education, 40*(1), 298-325. 10.3102/0091732X16667700 | • Limited personnel mean more teachers teach more out of subject courses. This would nullify teaching an AP or Dual Enrollment math and science courses<br><br>• rural teacher recruitment and retention have been described as the "rural | |

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| | school problem" almost from the beginning of the 20th century | |
| Hornbeck, D., & Malin, J. R. (2019). Superintendents' perceptions of the influence of a statewide dual enrollment policy on local educational programming. *International Journal of Educational Reform*, *28*(3), 253-277. | • Hard to find teachers that meet certification requirements<br>• Funding- some high school teachers qualify to teach some college level courses due to master's degree or other criteria.<br>• Textbook cost is a concern<br>• Not keeping staff<br>• Money pulled from other areas in local school | Practice:<br><br>Future Research: |
| Hemelt, S. W., & Swiderski, T. (2021). College Comes to High School: Participation and Performance in Tennessee's Innovative Wave of Dual-Credit Courses. *Educational Evaluation and Policy Analysis*, 01623737211052310. | • Advantage- SDC increased college-level course-taking during high school for students across the achievement distribution, including those in the middle 50% and bottom 25%, and did not detract from AP participation. P20<br>• Those who pass the state dual credit courses were the ones likely to pass AP courses<br>• Relationship between number of AP courses and student achievement. | Practice:<br><br>Future Research:<br>• Regarding EPSOs and expansion to less prepared students, we need more research on the implementation of courses p21<br>• Are schools that offer EPSOs or AP/DE courses offering courses they didn't already offer in |

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| | • expanding participation is likely to require courses that are accessible to schools, open to a diverse set of students, and offered in subjects that are accessible and appealing to students traditionally missed by existing programs. 6<br>• If students can't take the course at their school. If school can't offer the course. If kids don't want it. These are the factors determining if the course is "worth it" | non-college level courses?<br>how can states best support schools to offer a diverse advanced curriculum that will appeal to students with varied career interests? How can states hold high expectations for student performance in such courses while also providing appropriately aligned access to college credit? |
| Piontek, M. E., Kannapel, P. J., Flory, M., & Stewart, M. S. (2016). The implementation of dual credit programs in six nonurban Kentucky school districts (REL 2016–136). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Appala- chia. Retrieved from http://ies.ed.gov/ncee/edlabs. | • Key challenges include limited availability of high school teachers with appropriate credentials,<br>• limited access to courses and instructors in isolated rural districts,<br>• limited student readiness for college coursework,<br>• financial burden for students and families, discounted from $1K to just over $200<br>• inconsistent standards for ensuring course quality, and lack of dedicated staff to manage dual credit programs. | Practice: raises academic expectations; opportunity to add college credit; improves college readiness indicators;<br>Most dual credit was face to face. Online includes a teacher in room to oversee;<br>Not available to poverty kids due to money.<br>Small schools less likely to have varied offerings due to staffing capacity<br>Future Research: |

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| | • Quality assurances<br>• Academic prep. Limits expansion; ID weaknesses earlier to be addressed.<br>• Expand access with online where low interest ( | Increasing access to dual credit opportunities, especially in remote, rural locations |
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| Tran, H., Smith, D. A., & Fox, E. C. (2018). Perspectives of potential and current teachers for rural teacher recruitment and retention. *Center for Innovation in Higher Education report, available at: www. usccihe. org/s/SC-Teacher-Perspectives-on-RRI-Final-Draft-rev2. pdf*. | • Student inequities in education results in economic burdens to the community | |
| **Funding in Rural Schools**<br>**(subheading)** | Is racial disparity part of the inequity in funding? What does the research say? (Your existing section on racial disparity could be a fit depending on what the literature says about this | Practice:<br>Future Research: |
| Carrico, C., Matusovich, H. M., & Paretti, M. C. (2019). A qualitative analysis of career choice pathways of college-oriented rural central Appalachian high school students. *Journal of Career Development*, *46*(2), 94-111. | • Challenges- "Within rural Appalachia, career-related learning experiences can be limited by school population size, distance, transportation difficulties, and quantity and variety of resources" p.96 | Practice:<br>Future Research: |

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| | • Lower pop density. Rural road-increase travel time/expense | |
| Azano, A. P., Callahan, C. M., Missett, T. C., & Brunner, M. (2014). Understanding the experiences of gifted education teachers and fidelity of implementation in rural schools. *Journal of Advanced Academics*, *25*(2), 88-100. | • note, although federal policies ensure that special education services are delivered to those that qualify, no similar protections are offered for gifted students | Practice:<br>Limited resources; time challenges<br><br>Future Research: |
| Mokher, C. G., Lee, S., & Sun, C. (2019). Evaluating innovations for improving college and career readiness in rural schools. *Research in the Schools*, *26*(1), 48-63.<br><br>Mokher also mentions teacher turnover as a factor in not having consistent relationships between HS and Colleges. | • funding alone is not sufficient for creating meaningful change p 62<br>• sustaining relationships between high school and post-secondary is difficult<br>• consortium increased availability through online; PD to train teachers for AP<br>• Developed partnerships with colleges for more dist learning and DE<br>• Provided additional support<br>• challenges, such as classroom space and scheduling constraints, were logistical, | Practice:<br>Significant impact in course participation some change.<br>Grant funded<br>Members of consortium infused themselves in the community and that made a difference in implementation<br><br>Future Research:<br>Comprehensive support |
| Tran, H., Smith, D. A., & Fox, E. C. (2018). Perspectives of potential and current teachers for | • Replacing teachers (use in turnover point below) is costly for rural districts with high | |

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| rural teacher recruitment and retention. *Center for Innovation in Higher Education report, available at: www. usccihe. org/s/SC-Teacher-Perspectives-on-RRI-Final-Draft-rev2. pdf*. | poverty due to a limited tax base.<br>• The number of and quality teachers to spread around in a rural district for classes is limited | |
| **Teacher Turnover in Rural Schools**<br>**(subheading)** | | |
| Tran, H., & Smith, D. A. (2021). How Hard-to-Staff Rural School Districts Use State Funds to Address Teacher Shortages. *Journal of Education Finance, 47*(2), 130-156. | • school administrators often focus on filling vacancies from a recruitment perspective, teacher turnover is just as problematic p131 | |
| Tran, H., Smith, D. A., & Fox, E. C. (2018). Perspectives of potential and current teachers for rural teacher recruitment and retention. *Center for Innovation in Higher Education report, available at: www. usccihe. org/s/SC-Teacher-Perspectives-on-RRI-Final-Draft-rev2. pdf*. | • especially for high-poverty rural districts unable to leverage property tax levies to fund operating costs to the extent of low poverty peer districts p131<br>• Needs in rural SC ed: salary to be improved; specific rural training; specific admin support; Need to show advantages<br>• Lack of college for graduate studies | Practice: SC is one of 36 states that attempts to address rural teaching shortages<br>Future Research: |
| Gagnon, D. J., & Mattingly, M. J. (2015). State policy responses to ensuring excellent educators in rural schools. *Journal of* | • The challenge of staffing poor and remote rural schools with excellent teachers is well-documented. Just | Practice: some states are just beginning to explore policies intended to specifically |

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| *Research in Rural Education*, *30*(13), 1-14. | as the average student of color or student living in poverty is more likely to have a less excellent teacher—as measured by a great number of proxies—so too are rural students disadvantaged. P9<br>• neediest rural districts lack the resources and capacity to improve their standing; for this reason, federal and state support may prove critical. P10<br>• This is an attempt to level the teacher quality for poor and minoritized population students | address rural staffing concerns. P10<br><br>Future Research:<br>• We highlight eight states that present a range of rural staffing polices that are generally aligned with best practices as described in related literature, which could serve as useful case studies. Those states with innovative policies and sufficient data systems should be studied closely in the coming years, and researchers should endeavor to evaluate the effectiveness of these strategies. |
| Cowan, J., Goldhaber, D., Hayes, K., & Theobald, R. (2016). Missing elements in the discussion of teacher shortages. *Educational Researcher*, *45*(8), 460-462. | • Turnover rate is high most frequently in math and science and in urban, rural and low socioeconomic schools. | |
| Martin Palermo, Angela M. Kelly & Robert Krakehl (2021): Physics Teacher | • Analysis of physics teachers that changed schools proves that | Practice: |

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| Retention, Migration, and Attrition, Journal of Science Teacher Education, DOI: 10.1080/1046560X.2021.1946638 | many leave urban and rural schools to teach in suburban schools. The main predictors of movement are professional age and socioeconomic status of the school.<br>• Turnover of a rural physics teacher could mean that the school must replace part of or the whole department due to a teacher teaching many subjects.<br>• may inform future reforms in physics teacher preparation and induction, with attention toward serving the needs of novice teachers and preparing them for the challenges of high need academic settings. P18 | Future Research:<br>Study turnover in various courses to determine if turnover is related to a subject |
| Nguyen, T. D., Pham, L. D., Crouch, M., & Springer, M. G. (2020). The correlates of teacher turnover: An updated and expanded meta-analysis of the literature. *Educational Research Review*, *31*, 100355. | • likely stay in schools serving higher proportions of traditionally disadvantaged students if they feel supported and are satisfied with their working conditions. P12<br>• Study found teacher turnover is not related to students needing enhanced supports<br>• Higher academic ability teachers have higher turnover | Practice:<br>Higher academic ability teachers have higher turnover<br>Future Research: relational demography racial/ethnic gender matches between principals, teachers and students. Expectations for collaboration, leadership |

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| | • STEM, sped, young and less experience are likely to turnover<br>• STEM are likely to have opportunities outside of school for work. | opportunities and hours. Future research of how personal and school factors influence turnover |
| Tran, H., & Smith, D. A. (2021). How Hard-to-Staff Rural School Districts Use State Funds to Address Teacher Shortages. *Journal of Education Finance, 47*(2), 130-156. | • Teacher turnover costs to replace and retain a new teacher. Consistent turnover equals lower student achievement<br>• Money is a factor when HR and CFOs were surveyed. | |
| **Poverty as a factor of AP access** | | |
| Glennie, E., Mason, M., Dalton, B., & Edmunds, J. (2019). Preparing students for STEM college and careers: The influence of redesigned high schools in North Carolina. The High School Journal, 102(3), 228-257. | • Lack of courses being offered. "Thus, it is not so much the case that Black, Hispanic, and low-income students choose not to take college preparatory STEM classes as it is that they do not have access to such classes or encouragement and support to take them.<br>• This **lack of opportunity** can hinder the future their educational changes." p.231<br>• "If students do not complete college preparatory STEM classes in 9 th and 10th grades, they will not be able to take advanced | Practice:<br>Lack of opportunity leads to less involvement in advanced courses.<br>Less courses in prep = less course taking<br><br>Future Research:<br>These schools studied were part of an initiative. Schools were small by design. What impact does offering context aware courses to students in a small rural school make for kids? |

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| | STEM classes while in high school." p.232<br>• "Research has shown that students who are in underrepresented minority groups and who are low-income are less likely to enroll in STEM courses in high school.<br>• In NC study; like SC demographics rurally<br>• these schools had partnerships with colleges and/or local businesses that gave students more opportunities to imagine their futures. P251 | |
| Miller, L. C. (2012). Understanding rural teacher retention and the role of community amenities. *Center on Education Policy and Workforce Competitiveness website: http://curry. virginia. edu/uploads/resourceLibrary/1_Miller_CEPWC_WP_Ru ral_Retention. pdf*. | • Rural schools face inequity in teacher staffing versus non-rural schools | |
| Palermo, M., Kelly, A. M., & Krakehl, R. (2021). Physics Teacher Retention, Migration, and Attrition. *Journal of Science Teacher Education*, 1-24. | • those who left the profession altogether were less experienced and worked in high poverty, urban, and rural schools. *This is consistent with prior research that identified novice STEM teacher* | Practice: |

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| | *attrition as chronically problematic, particularly for high need schools (Carver-Thomas & Darling-Hammond, 2019; Harrell et al., 2019; R. Ingersoll & May, 2012).*<br>• teachers were 1.4% more likely to leave with each 1% increase in students qualifying for free or reduced lunch<br>• twice as likely to leave rural schools when compared to suburban schools. | Future Research: may inform future reforms in physics teacher preparation and induction, with particular attention toward serving the needs of novice teachers and preparing them for the challenges of high need academic settings. |
| **Positives of rural teaching** | | |
| Tran, H., Hardie, S., Gause, S., Moyi, P. & Ylimaki, R. (2020). Leveraging the perspectives of rural educators to develop realistic job previews for rural teacher recruitment and retention. The Rural Educator, 41(2), 31-46. https://doi.org/10.35608/ruraled.v41i2.866 | • These included administrative support, family-oriented culture, strong community relations and tight networks among teachers, community members and students, smaller class sizes and teacher autonomy. Them majority of the themes reflected relational aspects of the job. 36-37<br>• It also suggests alignment between what the rural schools offered and what the participants sought. 37<br>• Other teachers similarly shared powerful | Practice:<br><br>Future Research: |

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| | relationships they developed with their students, including having the opportunity to educate several members of a student's family, sometimes across generations. 38<br>• Smaller class sizes, flexible, outside labs at times<br>CHALLENGES<br>- lack of economic opportunities, cultural isolation, and small-town politics.<br>-low teacher pay; lack of economic opportunities for students due to no job prospects and poverty<br>-culturally different from their students in background<br>-lack of conveniences of bigger area<br>-lack of technology infrastructure<br>-lack of teachers from the US, turn toward international teachers/cultural differences with area<br>• -navigating social capital and local politics | |
| Duncheon, J. C., & Relles, S. R. (2020). " We're Caught In Between Two Systems": Exploring the Complexity of Dual Credit Implementation. *The* | • Scaffolding and bridging are needed due to the age of the students and their lack of experience/background knowledge. | Practice: |

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| *Review of Higher Education*, *43*(4), 989-1016. | • COMPLEXITY K12 teachers interacted with each other. As agents interaction changed how they did things. They faced two separate systems K12 and college. The teachers developed what worked. | Future Research: |
| Goldman, A. (2019). Interpreting Rural Students' Stories of Access to a Flagship University. The Rural Educator, journal of the National Rural Education Association, 2019, 40(1).<br><br>Students interviewed were all from small, rural, impoverished high schools | • ACADEMIC PREP is mentioned as an issue by some of these interviewees. Also mentioned is support and getting information about the process and what to expect<br><br>• Two students mentioned that their lack of HS prep. Amanda on p 20 is quoted, "I'm from...a very small school. I didn't have a lot of opportunities that others had from bigger schools. We didn't have any AP or higher-level classes so I was done with math and science credits my sophomore year in high school. I haven't done math and science for quite a while. Transitioning into college math and BIO 160 was a little difficult for me."<br><br>• Page 20 also was Hollie, "I've had some things push me back. Because I'm not very good at | Practice:<br><br>Prep and lack of access past a certain grade are mentioned.<br><br>Future Research:<br><br>"The link between students' experience in high school and their transition in college also needs further study." p26 |

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| | math and haven't had math since being a junior in high school, I actually have to take four math classes." | |
| Tran, H., Smith, D. A., & Fox, E. C. (2018). Perspectives of potential and current teachers for rural teacher recruitment and retention. *Center for Innovation in Higher Education report, available at: www. usccihe. org/s/SC-Teacher-Perspectives-on-RRI-Final-Draft-rev2. pdf*. | • smaller classroom sizes, a strong family environment at work, and the ability to make a visible impact in the lives of their students. Rural educator respondents talked about developing bonds and relationships with their students p21 | |
| Miller, L. C. (2012). Understanding rural teacher retention and the role of community amenities. *Center on Education Policy and Workforce Competitiveness website: http://curry. virginia. edu/uploads/resourceLibrary/1_Miller_CEPWC_WP_Ru ral_Retention. pdf*. | • Teachers at rural schools farther from their hometown are more likely to transfer and quit. This suggests that "Grow Your Own" programs may prove particularly beneficial in rural schools.<br>• Schools in rural communities with richer economic amenities (i.e., shopping, socio-economic health, and rents) have an easier time retaining teachers. P32<br>• Even mentions policy makers can ensure expansion of broadband | RETENTION IS AN ISSUE THAT IS THE CAUSE OF THIS STUDY |
| Biddle, C., & Azano, A. P. (2016). Constructing and Reconstructing the "Rural School Problem": A | • personal relationships, opportunities for contact and dialogue with community members | This leads into complexity and context leadership |

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| Century of Rural Education Research. *Review of Research in Education, 40*(1), 298-325. 10.3102/0091732X16667700 | across a variety of contexts (the grocery store, religious settings, school events, community suppers, the gas station) become sites of action and "naming" as rural educational leaders work to establish the trust necessary for mobilization on issues of importance to the community. There are many pressures to make these sites of action focused on individual progress of individual students toward the goals of the placeless institution, for example a discussion of student behavior advanced for the goal of increased standardized achievement. | |
| Frahm, M., & Cianca, M. (2021). Will They Stay or Will They Go? Leadership Behaviors That Increase Teacher Retention in Rural Schools. *The Rural Educator*, *42*(3), 1-13. | • Research has consistently shown that the quality of teachers working with students has a greater impact on academic achievement than any other school-related factor<br>• If individuals leave their positions after short periods of time, rural districts lose their initial financial outlay and have to reallocate valuable resources for securing replacements. As the financial costs | |

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| | connected with teacher turnover go up, the resources available for purchasing supplies, technology, and equipment decrease, amplifying the likelihood that the hygiene factors related to working conditions will emerge.<br>• strategies for building relationships, recognizing achievement, and encouraging an ethic of collective support in their organizations<br>• Unlike their counterparts in larger systems, however, rural school administrators have to be more purposeful about boosting the job satisfaction of new teachers using key motivators<br>• less administrative support and a more diverse range of responsibilities than principals and superintendents in urban or suburban settings, it is critical that they allocate their time as well as their attention with a high degree of intentionality. | |

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| Harris, R. S., & Hodges, C. B. (2018). STEM Education in Rural Schools: Implications of Untapped Potential. *National Youth-At-Risk Journal*, *3*(1), 3-12. | • There is a detrimental lack of research that combines both rural education and STEM curricula<br>• Finally, the programs that seem to be the most effective for provoking student interest are summer camps, internships, or distance learning opportunities, but these do not address the lack of STEM programs physically available to rural students.<br>• outreach disparity leaves the vast majority of rural students right where they began, without access to STEM education.<br>• Neglecting to provide satisfactory STEM education to rural populations does not only negatively impact the country's ability to compete in the global economy, but it unjustly neglects rural populations. In order to eradicate these problems, external sources of aid need to come together and address the lack of resources rural schools receive, how to approach STEM | |

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| | education in a locally relevant way, and how to equalize current outreach disparities. | |
| | • Our study suggests that the reason these courses are not offered in some schools is that administrators perceive that there are insufficient numbers of these high prior achieving students to justify forming classroom | |

**Appendix B: Principal Interview Protocol**

Name:_____ Title/Position:_____

Affiliated School:_____

**Introduction**

Thank you for allowing me to speak with you today. I have a keen interest in rural schools in South Carolina and have worked in many of these schools for most of my career in education. In preparation for completion of my dissertation, I want to hear what you think about providing the opportunity to learn in AP or dual enrollment math and science for students in your school.

Questions

**The Principal's Background**

How long have you been in education?

Additional Prompts: How long in administration? As a principal in this school?

Why did you want to be a rural school principal?

**Establishing AP/Dual Enrollment Courses**

Please begin by telling me your role in establishing AP or dual enrollment math and science courses for your students. (Chen, 2015; Koricich, 2015)

How did you believe the OTL in AP or dual enrollment courses would impact this school?

Can you explain the role any school staff members, or district level staff may have played in establishing or the continuation of these advanced courses? (Marion & Gonzales, 2013)

Did you allow for flexibility or ask for help in establishing or the continuation of these courses?

In what ways was the community involved in establishing AP or dual enrollment math and science? (Biddle et al., 2019; Klar & Huggins, 2020)

Can you think of examples of how any consortia, groups, or other examples you know of that may have helped you establish the OTL in AP or dual enrollment math and science?

Did you encounter any roadblocks to establishing AP or dual enrollment math and science?

Additional Prompts: poverty level of the area, enrollment, funding, or staffing (Palermo, 2021; Hornbeck & Malin, 2019), lack of student interest, community desires

How did you overcome these roadblocks?

Do your teachers participate by instructing AP/Dual Enrollment courses? Explain your Answer.

**Impact of Having the OTL in AP/Dual Enrollment Courses**

What changes have you seen in area students having an opportunity to take AP or dual enrollment math and science in your school? (Biddle et al., 2019)

Additional Prompt: Have the students here shown an interest in pursuing higher education or other opportunities for training at technical schools or specialty schools?

What does OTL in AP and dual enrollment math and science mean for students at your school? (An, 2015; Byun et al., 2017; Gagnon & Mattingly, 2015; Koricich et al., 2018; LaValley, 2018)

Because of increased OTL in your school, what do you find this changed in the community?

Additional Prompts: Could you give me some examples? What has feedback been from the community? (Klar & Huggins, 2020)

What have you done with the community feedback?

**Wrap Up**

What are the plans for these OTL in advanced courses at your school going forward?

Additional Prompt: What is your role as principal going forward with the OTL in advanced courses?

Is there anything else that you would like to share with me about decisions that were made and or agreements made that led to offering your students AP or dual enrollment math and science?

Describe the leadership of your school and district. Do you think leaders are only the people with administrative titles or those named department head of an area?

Is there anyone else that would be able to give me key insight into your high school's dual enrollment or AP math and science program? (Duncheon, J., & Relles, 2020; Harrington & Rogalski, 2020; Ohlson, 2020; Rimm-Kaufman et al., 2018)

**Appendix C: Dual Enrollment Coordinator or other key informant interview protocol**

Name:_____ Title/Position:_____

Affiliated School:_____

**Introduction**

Thank you for allowing me to speak with you today. I have a keen interest in rural schools in South Carolina and have worked in many of these schools for most of my career in education. In preparation for completion of my dissertation, I want to hear what you think about providing the opportunity to learn in AP or dual enrollment math and science for students in your school.

Questions

**The Dual Enrollment Coordinator's or other key informant's background**

How long have you been in education?

Additional Prompts: How long in administration? As a leader in this school?

Why did you want to work in a rural school?

**Establishing AP/Dual Enrollment Courses**

Please begin by telling me how your school was able to establish AP or dual enrollment math and science courses for your students? (Chen, 2015; Koricich, 2015)

How did you believe the OTL in AP or dual enrollment courses would impact this school?

Can you explain the role any of the school staff may have played in establishing these advanced courses? (Marion & Gonzales, 2013)

In what ways was the community involved in establishing AP or dual enrollment in math and science? (Biddle et al., 2019; Klar & Huggins, 2020)

Can you think of examples of how any consortia, groups, or any other examples you know of that may have helped establish the OTL in AP or dual enrollment in math and science?

How did you encounter any roadblocks to establishing AP or dual enrollment math and science?

Additional Prompts: poverty level of the area, enrollment, funding, or staffing (Palerno, 2021; Hornbeck & Malin, 2019)

How did you overcome these roadblocks?

**Supporting Students in AP/Dual Enrollment Courses**

What is the student enrollment process for AP or dual enrollment math and science in your school?

Additional Prompt: What role does your staff play in the continuation of these courses;

support of the courses; and the future outlook of these courses? (Marion & Gonzales, 2013)

**Impact of Having the OTL in AP/Dual Enrollment Courses**

What changes have you seen in area students' due to having opportunity to take AP or dual enrollment math and science in your school? (Biddle et al., 2019)

Additional Prompt: Have the students here shown an interest in pursuing higher education or other opportunities for training at technical schools or specialty schools?

What does OTL in AP and dual enrollment math and science mean for students at your school? (An, 2015; Byun et al., 2017; Gagnon & Mattingly, 2015; Koricich et al., 2018; LaValley, 2018)

Because of increased OTL in your school, what do you find this has changed in the community?

Additional Prompts: Could you give me some examples? What has feedback been from the community? (Klar & Huggins, 2020)

**Wrap Up**

What are the plans for these OTL in advanced courses at your school going forward?

Additional Prompt: What is your role going forward with the OTL in advanced courses?

Is there anything else that you would like to share with me about offering your students AP or dual enrollment math and science?

Is there anyone else that would be able to give me key insight into your high school's dual enrollment or AP math and science program? (Duncheon, J., & Relles, 2020; Harrington & Rogalski, 2020; Ohlson, 2020; Rimm-Kaufman et al., 2018)

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