

Analyzing the success of Hispanic boys in meeting college and career readiness standards in rural Texas high schools

Carlos Barron¹, John R. Slate ²

^{1,2} Sam Houston State University, College of Education, Department of Educational Leadership, Huntsville, TX, USA

Abstract

Examined in this investigation were the percentages of Hispanic boys who were college ready or not college ready as a function of the district's rural setting for three consecutive school years (i.e., 2016-2017, 2017-2018, and 2018-2019). Descriptive statistics were calculated for all three rural school district types combined and then separately for the three rural school districts (i.e., Rural Remote, Rural Distant, and Rural Fringe). With respect to this investigation, 41% of Hispanic boys met a College, Career, and Military Readiness indicator in mathematics. All three rural school district types had positive trends or negligible changes over the three consecutive school years for Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics. More than a third, 34.36%, of Hispanic boys from rural distant school districts met a college readiness indicator in mathematics. Similar percentages were present for Hispanic boys in rural remote school districts, 35.74%, and for Hispanic boys in rural fringe school districts, 36.01%. However, approximately two-thirds of Hispanic boys did not meet a college readiness indicator in mathematics in any of the three rural district type settings over three consecutive years. As such, educational leaders are encouraged to expand their efforts in this area, along with evaluating the efficacy of their current strategies.

Article History

Received 04.02.2024

Accepted 30.05.2024

Keywords

College; career readiness; Hispanic; rural school district

Introduction

The United States of America was built on the ideology that all men are created equal and are entitled to due process with all the basic rights afforded under the U.S. Constitution Bill of Rights (1789). Researchers such as Garcia et al. (2020) have voiced their concerns about students in poverty who do not have the same opportunities to enroll in advanced coursework as their peers who do not live in poverty. However, "Nearly one in six of those rural students live below the poverty line...one in nine has changed residence in the previous 12 months" (Showalter et al., 2019, p. 9). As defined by the U. S. Census Bureaus, rural communities are any city, town, or settlement with a population less than 2,500 residents (Cromartie & Bucholtz, 2008), and approximately 7.5 million students attended a public, rural school district in the United States prior to the Covid 19 worldwide pandemic (Showalter et al., 2019). To understand the limitations of rural communities, the National Center for Education Statistics published a report in 2016 that categorized rural school districts based on their geographical distance to a surrounding urban setting. The report is used to help researchers and public

Corresponding Author John R. Slate  jrs051@shsu.edu  Sam Houston State University, College of Education, Department of Educational Leadership, Huntsville, TX 77341 USA

institutions understand the geographical makeup of educational systems and their stakeholders (Geverdt, 2015). Of importance to this article was that the U. S. Census of 2020 cited that the Hispanic community was the fastest growing community in this country (United States Census, n.d.).

One in every seven American students graduated from school districts labeled as rural. In 2019, the U. S. median of rural students was 95,965 students. For the state of interest in this article, Texas had 693,668 rural students. In comparison, 463,129 students were educated in rural schools within Georgia. In the District Type Glossary of Terms 2017-2018, the Texas Education Agency has defined a rural school district as a school district with a student "enrollment between 300 and the median district enrollment for the state and an enrollment growth rate over the past five years of less than 20 percent" (Texas Education Agency, 2019, "Rural" section).

In 2017, Warne documented the presence of a positive relation between students who took advanced coursework and their ability to pay for course fees. The relation hinted that students enrolled in advanced coursework cannot cover financial costs without assistance from the school. In 2019, Showalter et al. cited that rural schools received less funding when compared to urban or metropolitan schools. Such lack of funding could limit student access to college coursework or to standardized testing due to the financial hardships associated with registration fees or tuition. As noted by Taie and Lewis (2020), students in rural communities were less likely to be proficient on Advanced Placement exams and tend to have reduced access to advanced coursework when compared to students from urban or affluent suburban communities. In addition, highlighted in the report (Showalter et al., 2020) was that the levels of poverty were most prevalent in rural communities in southern states such as Georgia and New Mexico. Though Texas has 14% of children between the ages of 5 and 17 live below the poverty level in rural communities, some communities in South Texas have poverty levels of 39% (Fletcher et al., 2021). Accordingly, Taie and Lewis (2020) established that most schools that offered dual enrollment college programs had approximately 86% participation rates in free or reduced-price lunch programs, and their families were responsible for the expenses associated with a dual enrollment course.

As defined by Conley, college readiness is "the level of preparation a student needs in order to enroll and succeed without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree..." (2007, p. 5). In addition, the United States Department of Education has argued that a rigorous curriculum has a strong influence on preparing students to be College and Career Ready (Fletcher et al., 2021). Furthermore, Conley determined that college ready students in mathematics possessed a deep and true understanding of mathematics. However, he noted that at least 40% of the graduating high school seniors did not have the "basic concepts, principles, and techniques of algebra" (p. 15). He went further to mention that students with college ready skills in mathematics would be able to use their mathematical skills to find a solution and then explain the solution as it pertained to the context. Students who enrolled in developmental courses because they are not College and Career Ready in mathematics or language arts are less likely to graduate from college due to the additional need for coursework. Students with a bachelor's degree tended to earn at least \$60,000 annually and had lower unemployment rates than students without a 4-year college degree (Fletcher et al., 2021).

Across the United States, public pressure on school districts to increase the percent of students who are college ready in mathematics has raised the student demand to access high stakes exams such as the SAT or the ACT. However, high stakes standardized exams such as the SAT or ACT have traditionally yielded lower student success rates (American College Testing, 2019). Due to the low success rates in standardized tests, school districts have ventured to other college ready indicators, such as dual enrollment in mathematics. Noted by Taie and Lewis in 2020, students in rural communities are less likely to have access to advanced coursework or to be able to take national high stakes exams such as the SAT or ACT because of the registration costs or fees associated with such programs. Consequently, Field (2021) contended that access to advanced coursework was not equitable by student groups and state demographics.

High schools with the lowest enrollment in dual credit courses had higher percentages of students of color than high schools with higher percentages of White students (Taylor & Lichtenberger, 2013). They also established that high schools with the lowest enrollment in dual credit courses were high schools with high percentages of students in poverty. In 2013, only 2% of Emergent Bilingual students were enrolled in Advanced Placement Calculus or other advanced mathematics courses in the nation; however, 22% of Grade 12 Hispanic students were college ready in mathematics in 2013 (Bojorquez, 2018). In 2019, 83% of high school students were not able to enroll in at least one dual credit course in the United States (Showalter et al., 2019). Garcia et al. (2020) established that students with little or limited access to advanced coursework, such as dual credit, were likely to need additional remediation in college. They determined that underrepresented students did not have the same opportunities and the same access to advanced coursework while in high school. Gagnon and Mattingly (2016) cited that remote, rural school districts with average poverty rates were 58% less likely to offer advanced coursework in contrast to urban school districts with similar poverty rates that were 97% more likely to offer advanced coursework. The probability for poor and remote rural school districts to offer advanced coursework is less than 49% (Gagnon & Mattingly, 2016).

Kotok (2017) determined that Hispanic students were more likely to be placed in lower-level mathematics courses or receive less rigorous instruction when compared to peers in similar advanced mathematics coursework such as trigonometry. Martinez and Welton (2014) noted that “low-income students of color are rarely placed in high level-courses” (p. 801). As a result, students of color from rural school districts did not have the prerequisite skills for advanced coursework (Renbarger & Long, 2019). A poor curriculum or limited financial resources were also factors in the low enrollment numbers of Hispanic boys in advanced coursework (Fletcher et al., 2021).

Rivera et al. (2019) documented that rural communities tended to have higher percentages of students in poverty with limited access to advanced coursework. They cited that students in rural communities are most likely to be less proficient in mathematics or science at the elementary school level and at the middle school level despite a high community network. Witenko et al. (2017) determined that Hispanic students were less likely to be in a college preparatory program because the students at these schools did not have the same access to advanced coursework as White students. Furthermore, they argued that Hispanic boys were less likely to be assigned to advanced courses in Honors or Advanced Placement. Similarly, Johnson (2019) observed that Emergent Bilingual students participated in less advanced

college level advanced coursework than non-Emergent Bilingual students despite the finding that higher participation in “rigorous academic courses in high school performs better on standardized tests” (p. 461). Hispanic students from rural communities had fewer college opportunities than their peers in urban or suburban schools (Hurtado et al., 2020).

In Texas, the state of interest for this investigation, Hispanic boys and girls represent the largest student group in public education but have the second lowest percent of student enrollment in advanced coursework such as Advanced Placement (Cha, 2015; Renbarger & Long, 2019). Martinez and Welton (2014) reported that only 54% of Hispanic high school students were encouraged to attend a 4-year university instead of a trade school or to join the workforce. Hence, they encouraged additional training for high school guidance staff to help students of color in high level poverty schools in Texas. In addition, teachers in rural Texas communities were less likely to teach the standards in mathematics or prepare students for college and career readiness than were mathematics instructors in urban or suburban schools (Edgerton & Desimone, 2018).

Students who enrolled in a 2-year or a 4-year institution were twice as likely to graduate from a postsecondary school than their fellow peers who had to enroll in developmental courses or who were not College and Career Ready after high school (Fletcher et al., 2021). In 2018, Bojorquez reported that lower percentages of students in rural Texas communities were college ready with the implementation of House Bill 5. In Texas, 694,000 students, or 13.8% of school enrollment, were in rural classrooms (Showalter et al., 2019). House Bill 5 removed the requirement that students graduate with Algebra 2, a prerequisite for College Preparatory Mathematics, Precalculus, or Advanced Placement Statistics. Only 23% of Hispanic students had taken Algebra 2 by Grade 12 compared to 52% of White adolescents. Consequently, 47% of White students were college ready in Grade 12, in contrast to 16% of African Americans or 23% of Hispanic students in Texas (Johnson, 2018).

With respect to Texas, Barnes and Slate (2014) determined that only 44.69% of Hispanic boys were college ready in mathematics in the 2007-2008 school year, with a slight increase to 48.31% in the 2008-2009 school year. In 2015, only 16% of Hispanic students were enrolled in Advanced Placement Calculus in Texas (Bojorquez, 2018). In a more recent school year, 2016-2017, approximately 54% of Hispanic students were determined to be College and Career Ready compared to 73% of their White peers who were determined to be College and Career Ready in Texas (Fletcher et al., 2021). In 2019, 38% of adolescents in Texas were college ready in Mathematics, but only 25% of Hispanic adolescents were college ready in mathematics (American College Testing, 2019).

The National Center for Education Statistics (2019) cited that 39% of Hispanic students had enrolled in postsecondary institutions in contrast to 42% of their White peers or 58% Asian students. Furthermore, more Hispanic girls (44%) were enrolled in postsecondary settings than were Hispanic boys (35%). Of importance is that in Texas, 47% of Hispanic adolescents were enrolled in dual credit courses (Field, 2021) which are cause for concern given the national percentages that are much higher than the low percentages in Texas. The relationship between school district setting and enrollment in advanced mathematics coursework has not yet been explored in the published research literature. As such, the purpose of this article was to ascertain the mathematics performance of Hispanic boys in comparison to the mathematics performance of their peers in small, rural school districts.

Statement of the Problem

In an analysis of the 2011-2012 Civil Rights Data Collection, the 2012 Small Area Income and Poverty Estimates, and the U. S. Census, researchers Gagnon and Mattingly (2016) contended that remote schools were least likely to offer advanced programs to their students. In Texas, 13.6% of students were enrolled in a rural school setting (Showalter et al., 2019). After changes in the Texas accountability system in 2019, school districts were encouraged to increase their number of students ready in college, career, and military readiness to obtain a more favorable letter grade rating for their district and campus (Morath, 2019). Furthermore, recent reports by the College Board and the American College Test, cite that high school students in Texas were less prepared for college mathematics when compared to their peers on the national stage (Fletcher et al., 2021). The problem that was investigated in this article was the extent to which Hispanic boys are meeting and/or not meeting College and Career Readiness in mathematics in a Texas rural educational setting between the 2016-2017, 2017-2018, and the 2018-2019 school years.

Purpose and Significance of the Study

The purpose of this study was to determine the extent to which the rural setting of school districts was related to Hispanic boys meeting and/or not meeting the College and Career Readiness standard in mathematics in Texas for the 2016-2017, 2017-2018, and 2018-2019 school years. Though research literature was available about the college readiness of Hispanic students in mathematics (e.g., American College Testing, 2019; Barnes & Slate, 2014; Lochmiller et al., 2016), no published empirical works could be located on the relationship between school district setting and enrollment in advanced mathematics coursework of Hispanic boys in Texas. As such, the purpose of this article was to ascertain the performance of Hispanic boys in comparison to their peers in small, rural school districts.

The significance of this study was to provide information about the degree to which differences might be present in College and Career Readiness in mathematics with Hispanic boys enrolled in a rural district setting and who may not always receive the same opportunities to advanced coursework as their peers in urban or large school districts. Even though the data were limited to three consecutive years, the findings from this multiyear analysis might contribute to how Hispanic boys are prepared or given access to high level coursework in mathematics in rural school districts, thus preparing them to be college ready in mathematics despite that the U. S. Census of 2020 noted that the Hispanic community was the fastest growing community (United States Census, n.d.). Hence, a low number of Hispanic boys who are College and Career Ready in mathematics their senior year of graduation would affect the monetary bonuses awarded to a school district and a school campus. A possible result of the findings may warrant how opportunities are afforded to students of color, such as Hispanic boys, when compared to boys across urban and suburban Texas or the United States. Furthermore, this situation influences the Texas school district accountability rating and College, Career, and Military bonuses that each district and campus receives for the number of students who are College, Career, and Military ready in mathematics.

Research Questions

In this article, the research questions addressed were: (a) What is the effect of a rural school district setting on the number and percentage of graduating Hispanic boys who met a College,

Career, and Military Readiness indicator in mathematics in the 2016-2017 school year?; (b) What is the effect of a rural school district setting on the number and percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics in the 2017-2018 school year?; (c) What is the effect of a rural school district setting on the number and percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics in the 2018-2019 school year?; and (d) What trend is present regarding rural school district setting on the change in the number and percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics in the 2016-2017, 2017-2018, and 2018-2019 school years?

Method

Research Design

The research design present herein was causal-comparative in nature (Johnson & Christensen, 2020) and was based on three years of historical data. Archival data were downloaded from the Texas Academic Performance Reports. A causal-comparative research design was used to determine the extent to which a relationship might be present between the independent variable and dependent variables. In this study, the dependent variable was the number of Hispanic boys who met and who did not meet the College and Career Readiness in mathematics. The independent variable was the rural setting of school districts.

Participants in this study were Hispanic boys in Grades 9 through 12 who met and who did not meet College and Career Readiness in mathematics. In this study, a rural school district included school districts that are rural fringe school districts, rural, remote school districts, and rural, distant school districts. The advanced coursework data for this study were obtained through the Texas Academic Performance Reports. Data were then imported into the Statistical Package for Social Sciences software program for analysis.

There were 1,247 school districts in Texas and 649 rural school districts, per the National Center for Education Statistics in 2019. Students who met College, Career, and Military Readiness in mathematics scored at least a 3 on Advanced Placement Calculus or Advanced Statistics, a minimum of 350 on the Texas Success Initiative Assessment mathematics, a minimum score of 19 on the ACT mathematics, at least 530 on the SAT math, passed a dual credit course in mathematics, passed an OnRamps mathematics course, or successfully passed a College Preparatory Mathematics course. In the Spring of 2021, the Texas Higher Education Coordinating Board revised the measures and passing criteria for the TSI; the new criteria is referred to as the TSIA 2.0. For the purpose of this article, College and Career Readiness on the TSI were based on data collected prior to the revision of 2021 (Texas Education Agency, 2021).

Participants and Instrumentation

In this article, school districts were defined by the Texas Education Agency as rural remote, rural distant, and rural fringe; consequently, 649 school districts have been categorized within the given parameters and were grouped together as rural school districts. Participants in this study were Hispanic boys in Grades 9 through 12 who met College and Career Readiness in mathematics for 2016-2017, 2017-2018, and 2018-2019. The advanced coursework data for this study were obtained through the Texas Academic Performance Reports. Data were then

imported into the Statistical Package for Social Sciences software program for analysis.

Students who met college, career, and readiness in mathematics scored at least a 3 on Advanced Placement Calculus or Advanced Statistics, a minimum of 350 on the Texas Success Initiative Assessment mathematics, a minimum score of 19 on the ACT mathematics, at least 530 on the SAT mathematics, passed a dual credit course in mathematics, passed an OnRamps mathematics course, or successfully pass a College Preparatory Mathematics course. In January 2021, the Texas Higher Education Coordinating Board reevaluated the Texas Success Initiative program and changed the college readiness criteria for mathematics and English Language Arts. Students must meet a minimum of 950 to be college ready in mathematics.

Results

Initially, descriptive statistics were calculated for all three rural school district types combined and then separately for the three rural school districts. Then, inferential statistical procedures were conducted to determine whether differences were present by school district type. Prior to performing any inferential procedures, checks for normality of data were conducted for the 2016-2017, 2017-2018, and 2018-2019 school years. Regarding the dependent variables, most of the underlying assumptions of an Analysis of Variance (ANOVA) procedure were met (Field, 2009; Slate, 2023). Accordingly, the use of a parametric ANOVA procedure was justified.

Overall Results for Rural School Districts Across the Three School Years

Table 1 contains the descriptive statistics for the percentages of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics across all three rural school district settings for three school years.

Table 1. Number of rural school districts by type for the 2016-2017, 2017-2018, and 2018-2019 school years

School Year	Rural Remote	Rural Distant	Rural Fringe
2016-2017	200	281	117
2017-2018	203	282	118
2018-2019	199	278	112

Descriptive statistics were initially calculated for all rural school districts combined and then separately for each of the three rural school district types for each of the three school years. In the 2016-2017 school year, out of a total of 1,048 Texas school districts, 699 were defined as rural school districts by the Texas Education Agency. This total consisted of 200 rural, remote school districts, 281 rural, distant school districts, and 117 rural fringe school districts. The average percentage of Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics across all three rural school district settings was 30.11% ($Mdn = 27.30\%$).

In the 2017-2018 school year, out of a total of 1,070 Texas school districts, 733 were defined as rural school districts by the Texas Education Agency. This total consisted of 203 rural, remote school districts, 282 rural, distant school districts, and 118 rural fringe school districts. The average percentage of Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics across all three rural school district settings was 35.10% ($Mdn = 31.6\%$).

With respect to the 2018-2019 school year, out of a total of 1,078 Texas school districts, 589 were defined as rural school districts by the Texas Education Agency. This total of 589 rural school districts consisted of 199 rural, remote school districts, 278 rural, distant school districts, and 112 rural fringe school districts. The average percentage of Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics across all three rural school district settings was 41.0% (*Mdn* = 37.35%). Table 1 contains the descriptive statistics for the percentages of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics across all three rural school district settings for three school years.

Results for Research Question One Across the Three School Years

With respect to research question one regarding the extent to which differences were present in the percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics as a function of the rural school district setting (i.e., Rural Remote, Rural Distant, and Rural Fringe) in the 2016-2017 school year, the parametric ANOVA did not reveal a statistically significant difference, $F(2, 287) = 0.98, p = .38$.

Table 2. Descriptive statistics for the percent of Hispanic annual graduates meeting TSI criteria in mathematics by rural school district setting in the 2016-2017 school year

Rural Setting	<i>n</i> of school districts	<i>M</i> %	<i>Mdn</i> %	<i>SD</i> %
Rural Remote	62	30.50	26.15	24.05
Rural Distant	127	28.35	26.00	20.12
Rural Fringe	101	32.22	30.40	19.75

As can be seen in Table 2, all three rural school district types had an average percentage of 30.36% of their Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics. Readers should note that the number of rural school districts that had available data was much smaller than the total number of rural school districts. Percentages were available for only 62 rural, remote districts, 127 of the rural, distant school districts, and 101 in the 2016-2017 school year. The reason for these low numbers of rural school districts that had available data is due to Texas Education Agency guidelines. For instance, when less than 5 students are present in the student group, masking rules are applied to protect the identity of the students.

Results for Research Question Two Across the Three School Years

With respect to research question two regarding the extent to which differences were present in the percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics as a function of a the rural school district setting in the 2017-2018 school year, the parametric ANOVA did not reveal a statistically significant difference, $F(2, 298) = 0.06, p = .94$.

Table 3. Descriptive statistics for the percent of Hispanic annual graduates meeting TSI criteria in mathematics by rural school district setting in the 2017-2018 school year

Rural Setting	<i>n</i> of School Districts	<i>M</i> %	<i>Mdn</i> %	<i>SD</i> %
Rural Remote	67	35.60	32.10	26.51
Rural Distant	128	35.02	32.70	24.84
Rural Fringe	106	36.10	32.15	20.17

As delineated in Table 3, all three rural school district types had an average percentage of 35.53% of their Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics. Readers should note that the numbers of rural school districts that had available data were much smaller than the total numbers of rural school districts. Percentages were available for only 67 rural, remote districts, 128 of the rural, distant school districts, and 106 in the 2017-2018 school year. The reason for these low numbers of rural school districts that had available data is due to Texas Education Agency guidelines.

Results for Research Question Three Across the Three School Years

With respect to research question three regarding the extent to which differences were present in the percentage of graduating Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics as a function of the rural school district setting in the 2018-2019 school year, the parametric ANOVA did not reveal a statistically significant difference, $F(2, 415) = 0.15, p = .86$.

Table 4. Descriptive statistics for the percent of Hispanic annual graduates meeting TSI criteria in mathematics by rural school district setting in the 2018-2019 school year

Rural Setting	<i>n</i> of School Districts	<i>M</i> %	<i>Mdn</i> %	<i>SD</i> %
Rural Remote	130	41.11	37.50	23.82
Rural Distant	207	39.70	36.40	23.22
Rural Fringe	81	39.70	30.80	27.10

As revealed in Table 4, all three rural school district types had an average percentage of 40.14% of their Hispanic boys who met a College, Career, and Military Readiness indicator in mathematics. Readers should again note that the numbers of rural school districts that had available data were much smaller than the total numbers of rural school districts. Percentages were available for only 130 rural remote districts, 207 of the rural distant school districts, and 81 in the 2018-2019 school year.

Results for Research Question Four Across the Three School Years

Regarding research question four about the presence of trends, results were consistent across the three school years. The percent of Hispanic boys who met a college readiness indicator in mathematics and graduated from rural distant school districts increased from 30.5% in the 2016-2017 to 35.6% in the 2017-2018 school years to 41.11% in the 2018-2019 school years. As such, a positive trend was observed in all three school years; however, the greatest increase, 10.61%, was present between the 2016-2017 and 2017-2018 school years. Depicted in Figure 1 are these percentages across the three school years.

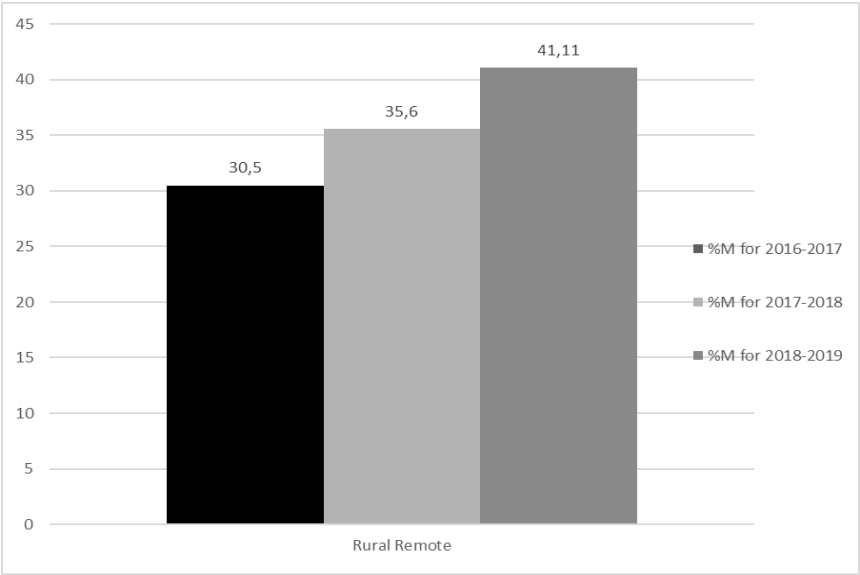


Figure 1. The average percentage of Hispanic annual graduate boys meeting TSI criteria in mathematics for rural remote school districts across three school years

With respect to rural fringe school districts, the average percentage increased from 3.88% in the 2016-2017 and 2017-2018 school years to 7.48% throughout the 2016-2017 and 2018-2019 school years. A positive trend was observed for rural fringe school districts in the three school years; however, the greatest increase, 3.88%, was present between the 2016-2017 and 2017-2018 school years. Percentages across the three school years are illustrated in Figure 2.

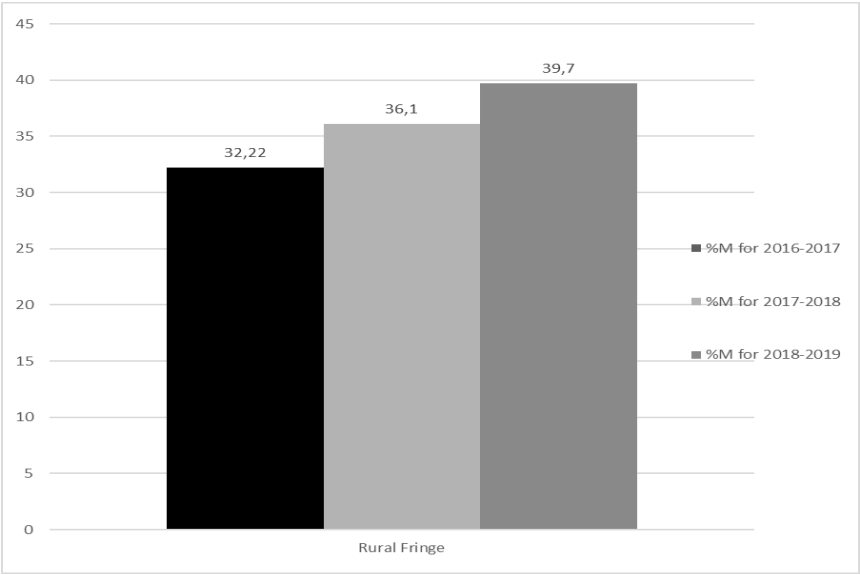


Figure 2. The average percentage of Hispanic annual graduate boys meeting TSI criteria in mathematics for rural fringe school districts across three school years

In contrast to the data of rural remote school districts where 35.74% of Hispanic boys, and 36.00% Hispanic boys from rural fringe school districts, only 34.36% of Hispanic boys from rural distant school districts met a college readiness indicator in mathematics. For the rural distant school districts, the percent of Hispanic boys who graduated from rural distant school districts and met a college readiness indicator in mathematics modeled positive trends for all three consecutive years. The percentage increased 6.67% in the 2016-2017 and 2017-2018 school years and then increased by 11.35% over the 2016-2017 and 2018-2019 school years. Represented in Figure 3 are these percentages across the three school years.

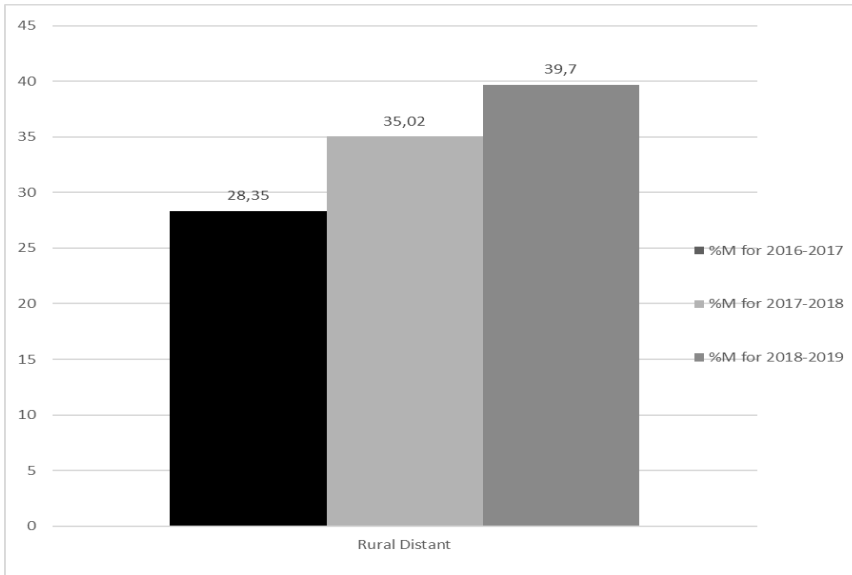


Figure 3. The average percentage of Hispanic annual graduate boys meeting TSI criteria in mathematics for rural distant school districts across three school years

With respect to the fourth research question, positive trends were observed during all three school years. The largest positive change in the average percentage was present with Hispanic boys meeting college readiness in mathematics from rural distant school districts. The average percentage of Hispanic boys who met a college readiness indicator in mathematics and graduated from rural distant school districts increased from 6.67% in the 2016-2017 and 2017-2018 school years to 11.35% increase over the 2016-2017 and 2018-2019 school years. Represented in Table 5 are these percentages across the three school years.

Table 5. Descriptive statistics for average change in percent of Hispanic annual graduates meeting TSI criteria in mathematics by rural setting over three consecutive years

Rural Setting	Change in Mean 2016-2018	Change in Mean 2017-2019	Change in Mean 2016-2019
Rural Remote	5.10	5.51	10.61
Rural Distant	6.67	4.20	11.35
Rural Fringe	3.88	3.60	7.48

Discussion

Descriptive statistics were calculated for all rural school districts combined. Represented in Figure 4 are these percentages across the three school years. Then descriptive statistics were calculated separately for each of the three rural school district types for each of the three school years. As depicted in Figure 5, a 2.79% difference was observed in the average percentage of Hispanic boys who had graduated from rural fringe school districts compared to the percentage of Hispanic graduates from rural distant school districts in the 2016-2017 school year. However, in the 2018-2019 school year, a difference of 3.87% was presented between the percent of annual graduates of Hispanic boys who met a college readiness indicator in rural fringe school districts compared to the percentage of annual graduates of Hispanic boys from rural distant school districts. Consequently, the percent of Hispanic graduates who met a college readiness indicator in mathematics increased between all three rural school districts across the three consecutive years (i.e., 30.11% in 2016-2017 increase to 41.00% in the 2018-2019 school year). Represented in Figure 5 are these percentages across each school year by rural school district type.

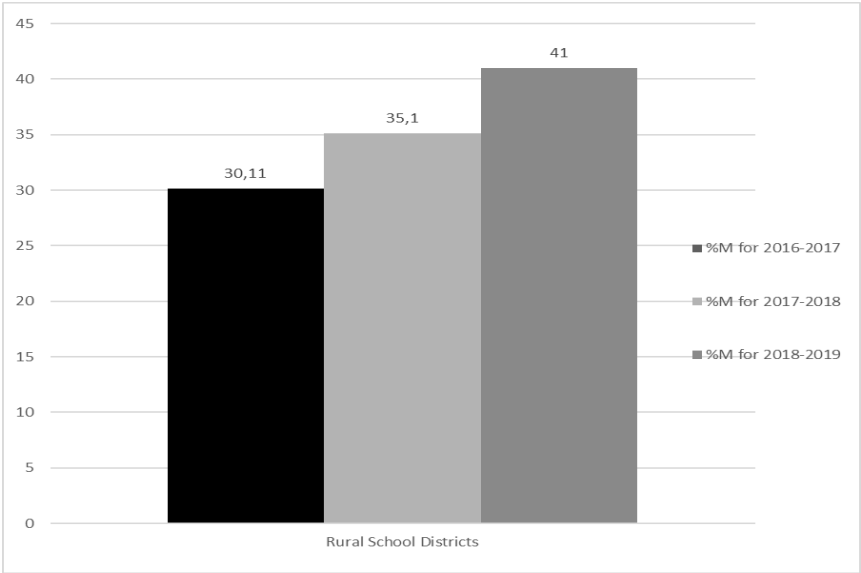


Figure 4. The average percentage of Hispanic annual graduate boys meeting TSI criteria in mathematics by rural school district setting across three school years

As noted by Showalter et al. (2019), students who attend rural school settings have limited access to standardized testing or college coursework. Taie and Lewis (2020) also reported that students in rural communities were less likely to be proficient on college level standardized exams and advanced coursework when compared to students from urban or affluent, suburban communities. Positive relationships have been documented between the ability to pay for course fees and the numbers of students who took advanced coursework (Warne, 2017). Fletcher et al. (2021) noted some communities in South Texas had poverty levels of 39%.

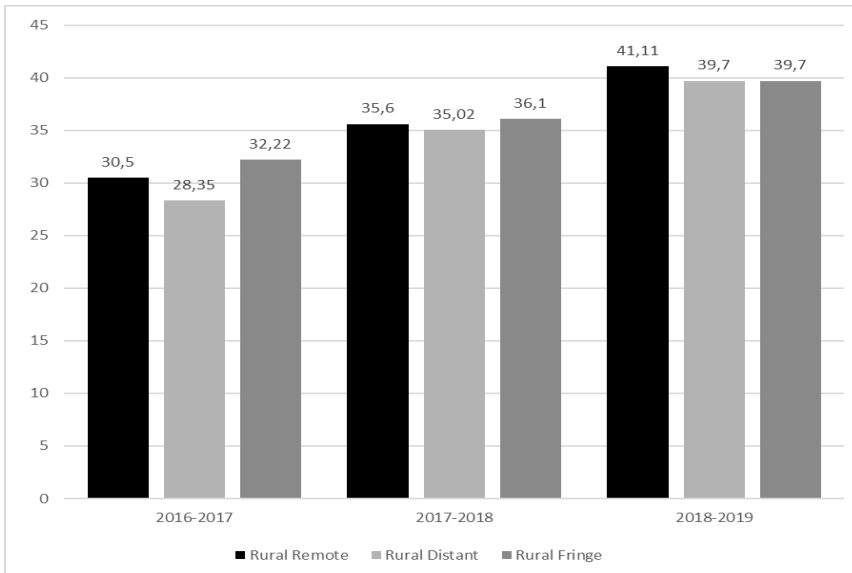


Figure 5. The average percentage of Hispanic annual graduate boys meeting TSI criteria in mathematics by rural setting over three consecutive years

As cited by the U. S. Census of 2020, the Hispanic community was the fastest growing community in this country (United States Census, n.d.). With respect to Texas Hispanic boys graduating between 2016 and 2019, all three rural school districts had steady average percentage increases in meeting college readiness in mathematics. Bojorquez (2018) noted that Hispanic students were less college ready in mathematics after the passing of House Bill 5. Collaborated in this statewide investigation, 59% of Hispanic boys had not met a college readiness indicator in mathematics when they graduated from a Texas rural high school in the 2018-2019 school year.

Implications for Policy and for Practice

Implications for policy and practice can be supported by this multiyear, statewide investigation. Considering that Hispanics are the largest community in the United States, the low percentages of Hispanic boys and trends established in this investigation between the three rural school settings are concerns for Texas school and district administrators. Low percentages of Hispanic boys meeting college readiness indicators in mathematics will amount to low or no College, Career, and Military bonuses and a low accountability rating for the campus and district. The findings can be used to drive strategic awareness of the district's accountability. As such, school and district leaders need to be accountable for students' college readiness in mathematics. As defined earlier, college readiness in mathematics can be obtained by earning at least 350 on the TSI mathematics, 520 on the SAT mathematics, or earning a college credit in college math.

The low percentages of Hispanic boys meeting a mathematics indicator can help drive changes in policy and resources that will benefit Hispanic students or other at-risk students in a rural school setting in Texas. However, the positive trend for all three rural school districts does warrant further review of the data and setting by region and financial resources. Thus, administrators should review the data for rural school districts and explore systems to meet

the needs of Hispanic boys not meeting college readiness in mathematics. The data should be used to provide awareness sessions to stakeholders like the community, students, and campus staff on ways to meet the indicators in mathematics. Because Hispanic boys are 50% of the fastest growing population in Texas, researchers need to address the low percentage of Hispanic boys in rural school districts that are not meeting college readiness in mathematics.

Recommendations for Future Research

Because this investigation is limited to three consecutive years of data in Texas, future researchers should analyze data from school years after the COVID-19 pandemic to compare results from the three school years, particularly concerning the effects on achievement and college readiness in mathematics of Hispanic boys in rural school districts. Hence, research studies are warranted to identify solutions for the achievement and performance gaps between Hispanic boys, girls, or at-risk students. Then, researchers are encouraged to study the percentage of Hispanic boys in English Language Arts for patterns in the same settings as this investigation.

Also examined in this study were performance and statistical investigations to examine rural school settings, but researchers need to examine student performance data from other states to identify achievement gaps in other states or at the national level for college readiness in mathematics. Then, they should compare the same sample for college readiness in English Language Arts. Furthermore, researchers need to focus on districts to ascertain whether relationships are present between the low number of Hispanic students in certain regions of the state i.e., Gulf Coast, Rio Grande, Central, Panhandle, West Texas, and East Texas. Finally, the focus of this study was on the school district setting with respect to Hispanic boys meeting a college readiness indicator in mathematics. Future researchers should consider investigating performance data based on gender, other racial/ethnic groups, and other identified subpopulations. Researchers should examine the performance of boys and girls on state-mandated exams and determine whether similar relationships are present to indicators in mathematics or English Language Arts. Then, they should review the data for trends or gaps in performance based on gender or a school district's setting. Finally, researchers should also examine performance data on other subgroups in Texas and other states. In addition, researchers should examine college readiness indicators for other boys such as students in poverty, students who are in special education programs, and Emergent Bilingual students.

Conclusion

In this multiyear investigation, the percentage of Hispanic boys meeting a college readiness in mathematics was compared by the rural setting of school districts. Descriptive statistics were calculated for the percentages of Hispanic boys who met a mathematics college indicator for rural, remote school districts, rural, distant school districts, and rural fringe school districts in three consecutive school years (i.e., 2016-2017, 2017-2018, and 2018-2019). A high percentage, over half, of Hispanic boys failed to meet the College, Career, and Military Readiness in mathematics. Inequities in or access to a quality high school instructional program (Fletcher et al., 2021) in rural school districts could be argued to be causes for low percentages or discrepancies in the low percentage of Hispanic boys meeting a college readiness indicator in mathematics.

Declarations

Acknowledgments: Not applicable.

Authors' contributions: CB and JRS made equal individual contributions of authors to this manuscript. Both contributed to the development of the research topic, to the analysis of the data, to the interpretation of the results, and to the discussion sections. CB is the lead author because this manuscript was part of his doctoral dissertation.

Competing interests: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethics approval and consent to participate: This research received written permission from the Institutional Review Board at Sam Houston State University to conduct this study.

Publisher's note: Culture, Education, and Future remains neutral with regard to jurisdictional claims in published maps and institutional affiliation.

Orcid ID

John R. Slate  <https://orcid.org/0000-0001-9915-7849>

References

- American College Testing. (2019). *The condition of college & career readiness 2019*. Retrieved July 11, 2022, from <https://www.act.org/content/dam/act/unsecured/documents/National-CCCR-2019.pdf>
- Barnes, W., & Slate, J. R. (2014). College-readiness rates in Texas: A statewide, multiyear study of ethnic differences. *Education and Urban Society*, 46(1), 59-87. <https://doi.org/10.1177/00131245114237>
- Bojorquez, H. (2018). Rural districts take a 24 percent hit in Algebra II enrollment. *Intercultural Development Research Association*, 45(5), 3-4. <https://files.eric.ed.gov/fulltext/ED591756.pdf>
- Cha, S. (2015). Exploring disparities in taking high level math courses in public high schools. *KEDI Journal of Educational Policy*, 12(1), 3-17. <http://eng.kedi.re.kr/>
- Conley, D. T. (2007). *Refining college readiness*. Educational policy improvement Center. Retrieved June 5, 2022, from <https://files.eric.ed.gov/fulltext/ED539251.pdf>
- Cromartie, J., & Bucholtz, S. (2008). *Defining the "Rural" in rural America*. US Department of Agriculture. Retrieved August 29, 2022, from <https://www.ers.usda.gov/amber-waves/2008/june/defining-the-rural-in-rural-america/>
- Edgerton, A. K., & Desimone, L. M. (2018). Teacher implementation of College- and Career-Readiness Standards: Links among policy, instruction, challenges, and resources. *AERA Open*, 4(4). <https://doi.org/10.1177/2332858418806863>
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Sage.
- Field, K. (2021). The rise of dual credit. *Higher Education*, 21(1). <https://www.educationnext.org/rise-dual-credit-more-students-take-college-classes-high-school-degree-attainment-rigor/>

- Fletcher, C., Cornett, A., & Webster, J. (2021). *State of Student Aid and Higher Education in Texas*. <https://files.eric.ed.gov/fulltext/ED613370.pdf>
- 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. <https://doi.org/10.1177/1932202X16656390>
- Garcia, H. A., Eicke, D., McNaughtan, J., & Harwood, Y. (2020). Understanding dual credit programs: Perspectives from faculty, staff, and administrators. *Community College Journal of Research and Practice*, 44(8), 584-594. <https://doi.org/10.1080/10668926.2019.1626301>
- Geverdt, D. (2015). *Education Demographic and Geographic Estimates Program (EDGE): Locale Boundaries User's Manual*. U.S. Department of Education. Retrieved July 14, 2022, from <http://nces.ed.gov/pubsearch>
- Hurtado, S., Ramos, H. V., Perez, E., & Lopez-Salgado, X. (2020). Latinx student assets, college readiness, and access: Are we making progress? *Education Sciences*, 10(4). <https://link.gale.com/apps/doc/A630408736/AONE?u=anon~70904613&sid=googleScholar&id=ab4544ef>
- Johnson, A. (2019). A matter of time: Variations in high school course-taking by years-as-EL subgroup. *Educational Evaluation and Policy Analysis*, 41(4), 461-482. <https://doi.org/10.3102/0162373719867087>
- Johnson, P. N. (2018). Getting it just right! Rigor and collömbçege prep for all. *Intercultural Development Research Association*, 45(5), 1-2. <https://files.eric.ed.gov/fulltext/ED591756.pdf>
- Johnson, R. B., & Christensen, L. (2020). *Educational research: Quantitative, qualitative, and mixed approaches* (7th ed.). Sage.
- Kotok, S. (2017). Unfulfilled potential: High-achieving minority students and the high school achievement gap in math. *The High School Journal*, 100(3), 183-202. doi:10.1353/hsj.2017.0007
- Lochmiller, C. R., Sugimoto, T. J., Muller, P. A., & Williamson, S. E. (2016). *Dual enrollment courses in Kentucky: High school students' participation and completion rates*. Retrieved June 1, 2022, from https://ies.ed.gov/ncee/rel/regions/appalachia/pdf/REL_2016137.pdf
- Martinez, M. A., & Welton, A. D. (2014). Examining college opportunity structures for students of color at high- "Minority," high-poverty secondary schools in Texas. *Journal of School Leadership*, 24(5), 800-841. <https://doi.org/10.1177/105268461402400501>
- Morath, M. (2019). *House Bill 3 Implementation: CCMR outcome bonus allowable expenses*. Texas Education Agency. Retrieved July 10, 2022, from <https://tea.texas.gov/sites/default/files/House-Bill-3-HB-3-Implementation-CCMR-Outcomes-Bonus-Allowable-Expenses.pdf>
- National Center for Education Statistics. (2019). *Indicator 19: College participation rates*. Retrieved August 15, 2022, from https://nces.ed.gov/programs/raceindicators/indicator_rea.asp
- Renbarger, R., & Long, K. (2019). Interventions for postsecondary success for low-income and high potential students: A systemic review. *Journal of Advancement Academics*, 30(2), 178-202. <https://doi.org/10.1177%2F1932202X19828744>
- Rivera, S., Knack, J. M., Kavanagh, K., Thomas, J., Small, M. M., & Ramsdell, M. (2019). Building a STEM mentoring program in an economically disadvantaged rural community. *Journal of Educational Research and Practice*, 9(1), 413-422. <https://files.eric.ed.gov/fulltext/EJ1278133.pdf>

- Showalter, D., Hartman, S. I., Johnson, J., & Klein, B. (2019). *Why rural matters 2018-2019*. Rural School and Community Trust. <https://files.eric.ed.gov/fulltext/ED604580.pdf>
- Slate, J. R. (2023). *Communicating your statistical findings in a formal and scholarly way: A guide for graduate students, faculty, and educational leaders*. ICPEL Publications. International Council of Professors of Educational Leadership. <https://www.lulu.com/shop/john-slate/communicating-your-statistical-findings-in-a-formal-and-scholarly-way-a-guide-for-graduate-students-faculty-and-educational/paperback/product-vprd8v.html>
- Taie, S., & Lewis, L. (2020). *Dual or concurrent enrollment in public schools in the United States*. National Center for Education Statistics. Retrieved July 10, 2022, from <https://nces.ed.gov/pubs2020/2020125.pdf>
- Taylor, J., & Lichtenberger, E. (2013). Who has access to dual credit in Illinois? Examining high school characteristics and dual credit participation rates. *Illinois Education Research Council*, 4, 1-20. <https://files.eric.ed.gov/fulltext/ED555454.pdf>
- Texas Education Agency. (2019). *District Type Glossary of Terms, 2017-2018*. Retrieved June 1, 2022, from <https://tea.texas.gov/reports-and-data/school-data/district-type-data-search/district-type-glossary-of-terms-2017-18#teadist>
- Texas Education Agency. (2021). *The TSIA (Texas Success Initiative Assessment)*. <https://tea.texas.gov/academics/college-career-and-military-prep/the-tsia-texas-success-initiative-assessment>
- U. S. Constitution. (1789). *Bill of rights*. Retrieved July 7, 2022, from <https://www.senate.gov/about/origins-foundations/senate-and-constitution/constitution.htm>
- United States Census. (n.d.). *2020 Census*. Retrieved July 3, 2022, from <https://www.census.gov/programs-surveys/decennial-census/decade/2020/2020-census-main.html>
- Warne, R. (2017). Research on the academic benefits of the Advanced Placement program: Taking stock and looking forward. *Sage*, 7(1), 1-16. <https://doi.org/10.1177/2158244016682996>
- Witenko, V., Mireles-Rios, R., & Rios, V. (2017). Networks of encouragement: Who's encouraging Latina/o students and White students to enroll in Honors and Advanced-Placement (AP) Courses? *Journal of Latinos and Education*, 16(3), 176-191. <https://www.tandfonline.com/doi/full/10.1080/15348431.2016.1229612>