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Achieving Educational Equity in Minnesota's K-12 Public School Districts

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Jennifer Yang has successfully defended her Dissertation, *Achieving Educational Equity In Minnesota's K-12 Public School Districts* and should be recommended to the Dean of the School of Business to receive the degree of PhD in Management and Public Service.

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ACHIEVING EDUCATIONAL EQUITY IN MINNESOTA'S K-12 PUBLIC SCHOOL DISTRICTS

A DISSERTATION

By

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ABSTRACT

This study seeks to determine whether there are relationships between: first, public funding investment and educational equity; second, access to opportunities for students of color and disadvantaged backgrounds and educational equity; third, the interaction effect between access to opportunities for students of color and disadvantaged backgrounds and public funding investment on educational equity; fourth, teacher workforce diversity and educational equity; and fifth, the interaction effect between teacher workforce diversity and public funding investment on educational equity. The Minnesota Achievement and Integration Program is the source of public funding for this study, and the program was established in the 2013-2014 school year to accelerate racial integration and improve educational equity for students in Minnesota K-12 public school districts. A decade after the implementation of the A&I Program, despite the state's public funding investment to create educational opportunities and increase academic achievements for students of color and disadvantaged backgrounds, concrete disparities continue to exist. The purpose of this study is to better understand existing efforts and their direct impact on educational equity. The study determines the effectiveness of public funding investment in achieving educational equity in Minnesota's K-12 public school districts through the A&I Program and seeks to identify specific efforts that positively impact educational equity such as access to opportunities for students of color and disadvantaged backgrounds and diversifying the teacher workforce.

Keywords: Achievement and Integration, educational opportunities, teachers of color, rigorous coursework

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CHAPTER 1

1. INTRODUCTION

There is consensus about the need for educational reform and effective public policy to achieve educational equity in Minnesota. The heightened concern is that historical and existing educational disparities disproportionally affect students of color and disadvantaged backgrounds (SOCDs). For example, in 2020, the high school graduation rate statewide was 83.8% (Minnesota Department of Education [MDE], 2022a). However, when examined by race/ethnicity, the graduation rate for White students was 89% compared to Black students at 69.2%, American Indian/Alaska Native at 55.7%, and Hispanic/Latino students at 70.4% (MDE, 2022a). And yet, educational equity is complex and at the same time constantly changing with the growing diversity of our students and needs of the population. Recognizing the importance of providing equal access to resources and equal opportunity in the educational setting, Minnesota is focused on ensuring adequate inputs are invested in the education system to deliver quality education (Reschovsky, 1994).

Minnesota's history reveals the substantial shift to provide fiscal support for racial integration and reducing educational disparities. In specific, the Achievement and Integration (A&I) Program was initiated in the 2013-2014 school year to intentionally "pursue racial and economic integration and increase student academic achievement, create equitable educational opportunities, and reduce academic disparities based on student's diverse racial, ethnic, and economic backgrounds" (Achievement and Integration Statute 124.D.861 of 2013). The goal of the A&I Program is to reduce disparities across school districts, and improve experiences and outcomes for disadvantaged students, including students of color and lower socioeconomic status (Strom, 2021).

However, increased program funding does not guarantee improved educational equity in the school setting, across student populations (National Research Council, 1990). The A&I Program is an investment strategy to reduce disparities in the educational setting, and yet, these inputs may have very little influence or linkage with outcomes such as improved educational equity. This study seeks to determine if there is a relationship between Minnesota's public funding investment of the A&I Program and educational equity for students in K-12 public school districts. Specifically, the study examines Minnesota's A&I Program and its effects on reducing educational disparities for SOCDs. What other investments are needed to gain significant ground toward achieving improved educational equity? Do we need additional policy changes to further refine the A&I Program to better achieve the objectives?

For this reason, the research examines two additional constructs—teacher workforce diversity and access to opportunities for SOCDs—to describe their effects on educational equity. The research examines the interaction effects of these variables with public funding investment and how the interaction effects impact educational equity overall. Public funding is a clear input variable in the goal of achieving educational equity. The purpose of examining teacher workforce diversity and student access to opportunities is to better understand other influences and variables. Berne and Stiefel (1990) argue that equity is not just affected by inputs but also affected by the process, such as issues that take place in the classroom setting and what courses students have access to and are taking in preparation for college. The A&I Program encourages school districts to implement strategies, such as increasing enrollment in college readiness programs and rigorous coursework, and recruiting and retaining racially and ethnically diverse workforce (MDH, 2022h). And, this study explores the relationship between these two variables

and their direct impact on educational equity. The results of this study may help steer public policy and fast-track reform to reduce the educational gaps and disparities for SOCDs.

1.1 Statement of the Problem

The A&I Program was established to accelerate racial integration and improve educational equity for students in Minnesota K-12 public schools. Minnesota Statute §124D.861, Subdivision 2(a) outlines that school districts must have a long-term plan in place to achieve the following two goals: first, to reduce the academic achievement disparities among students, and second, to increase the "racial and economic integration in schools and districts" (Achievement and Integration Statute 124.D.861 of 2013). A decade after the implementation of the A&I Program, despite the state's public funding investment to create educational opportunities and increase academic achievements for SOCDs, concrete disparities continue to exist.

The recent lawsuit, *Cruz-Guzman v. State of Minnesota*, heightened the scrutiny of Minnesota's ability to provide adequate education for students of color (Verges, Pioneer Press, 2015). In November 2015, a class-action lawsuit was initiated by seven families and a nonprofit organization, arguing that Minneapolis and St. Paul public schools continue to exacerbate racial segregation and therefore deprive students an adequate education under Minnesota's constitution (ACLU, 2022). In 2018, the Minnesota Supreme Court ruled that the case will move forward, confirming that the legislature has a duty to uphold the Minnesota constitution of establishing "a general and uniform system of public schools" (Minn. Const. art. XIII, § 1). However, on September 26, 2022, the ruling upholds that the segregation of schools does not violate the Minnesota constitution unless there is direct legislative intent that causes it (Bennett, 2022). With this very recent ruling, it seems more important than ever to implement additional reform and

effective public policy to address the deepening disparities that disproportionately impact SOCDs.

1.2 Background

To provide more context on the historical and current efforts of advancing educational equity, this section summarizes the historical background of Minnesota's school Integration Revenue Program and the current A&I Program which was implemented in the 2013-2014 school year; educational equity in Minnesota; and the importance of examining other components of the education process (teacher workforce diversity and student access to opportunities) and their impact on educational equity.

Minnesota's Integration Revenue Program and the Establishment of A&I

The A&I Program was proposed and approved in the 2013 legislative session, but work began in 2011 (Strom, 2021). The A&I Program was established to replace Minnesota's Integration Revenue Program, which was in place since 1997 (Office of Legislative Auditor [OLA], 2005). The Integration Revenue Program (IRP) provided funds to 80 schools in 2005, totaling $79 million dollars in revenue to implement racial integration (OLA, 2005). Schools that qualify for this funding are specifically "racially identifiable schools" which is defined as schools "with a significantly greater minority concentration than the school district as a whole for the grade levels served by that school" (OLA, 2005, p. x). In addition, school districts also are eligible to receive this funding if they are racially isolated school districts (OLA, 2005). Racially isolated school districts are defined as having a higher concentration of minority students compared to their neighboring districts (OLA, 2005). For the applicable districts, they may partner with surrounding districts to establish "a multidistrict collaboration council" to develop strategies for improving integration wholistically (OLA, 2005). The purpose of

multidistrict collaborations is to develop an integration plan to highlight the goals and outline how they plan to achieve the goals collectively (OLA, 2005).

The IRP was based on the student population that was "protected"—students who are identified in one or more of the following categories: African/Black American, Asian/Pacific American, Chicano/Latino American, or American Indian/Alaskan Native (OLA, 2005). The school district's IRP revenue is based on its total enrollment at a rate established in state law (OLA, 2005). A school district is eligible for this funding in one of three ways: (1) if it has one or more racially identifiable schools—having more than 20 percentage points of protected students above the proportion of protected students for the district as a whole for those grades served by the school (racially isolated school district); (2) if the district's proportion of protected students exceeds their neighboring district by more than 20 percent; or (3) if the school district that is not identified as a neighboring district volunteers to work with racially isolated district (OLA, 2005).

In November 2005, OLA released a report detailing the issues with the IRP. In summary, the OLA noted that the funding from the IRP were not consistently and effectively used to achieve its goals. In specific,

> …school districts use their integration revenue for a wide array of programs…Some school districts have used their integration revenue for questionable purposes. The program's vague guidelines also make it difficult to measure the impact of the Integration Revenue program. Minnesota laws governing the program do not require school districts nor the Minnesota Department of Education systematically evaluates the districts' integration programs to determine their impact. (OLA, 2005)

The report notes that the purpose of the IRP was not clear, and in fact, districts were not required to use the funding to address the racial imbalance within and across school districts consistently or effectively (OLA, 2005).

In response to the OLA report, the legislature created and mandated the Integration Revenue Replacement Advisory Task Force and this group began meeting in November 2011 (Mattheis, 2016). The task force was charged with determining the roles and responsibilities of schools for addressing racial inequities and educational disparities (Mattheis, 2016). The task force was required to submit a report to the legislature by February 2012 to recommend how to restructure the IRP and its revenue to improve educational outcomes for K-12 students (Mattheis, 2016). Through eight task force meetings, the A&I Program was recommended to replace the IRP (Mattheis, 2016).

The A&I Program was established to achieve racial integration and reduce educational disparities for SOCDs (MDE, 2022h). Minnesota Statutes, sections 124D.861 and 124D.862 (2013) were passed as state law in response to the OLA report. The state law outlines that each school board of the eligible school district will have a formal long-term plan developed and implemented. Additionally, the eligible school district must conduct research-based interventions that include practices to reduce the disparities in student academic performance based on progress and growth in reading and math assessments (Achievement and Integration Statute 124.D.861 of 2013). Lastly, as part of this effort, school districts need to eliminate duplicative programs and services to create efficiencies, “which may include forming collaborations or a single, seven-county metropolitan areawide partnership of eligible districts for this purpose” (Achievement and Integration Statute 124.D.861 of 2013).

The long-term plan and strategies may include the following program components: innovative school enrollment choices, family engagement initiatives, professional development opportunities for teachers and administrators including those who are underrepresented among the licensed teachers or administrators in the district or school, increasing more effective and diverse instructors focused on rigor and college and career readiness for underserved students, and the recruitment and retention of teachers and administrators of color (Achievement and Integration Statute 124.D.861 of 2013). As part of the plan, the school district must include a detailed budget for review and approval by the Commissioner of the Minnesota Department of Education (Achievement and Integration Statute 124.D.861 of 2013). As a requirement of the program, the school board will report its progress at an annual hearing (Achievement and Integration Statute 124.D.861 of 2013). At the hearing, the school board will provide longitudinal data to reflect progress in meeting the program's objectives (Achievement and Integration Statute 124.D.861 of 2013). Lastly, the plan and data will be available on the school district's website (Achievement and Integration Statute 124.D.861 of 2013).

Similar to the original IRP, there are four ways in which a school district is eligible for the program funding. First, the school district's enrollment of protected class students is more than 20 percent compared to a neighboring school district's number of protected class students (racially isolated). Second, the school district physically adjoins a racially isolated district (adjoining district). Third, the enrollment of protected class students at a school is more than 20 percent compared to the number of protected class students within the district for the same grade level (racially identifiable school). Fourth, the district participates voluntarily and is approved by the MDE (MDE, 2022h).

The program revenue is made up of two parts: initial and incentive revenue. The qualifying school district's initial revenue for the A&I Program is equal to the lesser of 100.3 percent of the district's expenditures as approved by the MDE Commissioner, or the sum of:

> $350 times the district's adjusted pupil units for that year times the ratio of the district's enrollment of protected students for the previous school year to total enrollment for the previous year; and, the greater of zero or 66 percent of the difference between the district's integration revenue for fiscal year 2012 and the district's integration revenue for fiscal year 2014. (Achievement and Integration Statute 124.D.862 of 2013)

Figure 1

Initial Revenue Funding Formula

$$\$350 \times \text{district's adjusted pupil units for the current year} \times \frac{\text{ratio of district's enrollment of protected students (prior year)}}{\text{Total enrollment (prior year)}}$$

Note. Source: Booker & Moe, 2022.

Moreover, the qualifying school district may receive additional incentive revenue of $10 per adjusted pupil unit (Achievement and Integration Statute 124.D.862 of 2013). The incentive revenue is specifically designed to reduce racial and economic disparities (MDE, 2022h). The A&I Program revenue cannot fund English learner and special ed programs or initiatives, existing funding or activities, segregation activities, and staff who do not directly support or implement the district's A&I Program (MDE, 2022h). The overall A&I Program budget is supported by 30% local levy and 70% aid appropriation. The program is not funded by grant dollars (Booker & Moe, 2022).

The A&I Program revenue can be used for: at least 80 percent of the budget must be devoted to direct student services, up to 20 percent of the budget can be used for professional

development, and no more than 10 percent of the budget can be allocated to administrative costs (MDE, 2022h; Achievement and Integration Statute 124.D.862 of 2013). Direct student services include services that are directly for students: materials, salary and benefits for teachers who provide instruction to students under this program, food, family engagement programs, and transportation (MDE, 2022h). Professional development may be used for teaching strategies and relate costs for coaching, mentoring, and professional learning experiences (MDE, 2022h). For districts that do not meet their goals during the last three years of their plan, 20 percent of the revenue must go toward implementing improvement plans until the goals are achieved (MDE, 2022h).

Educational Equity in Minnesota

Presently, Minnesota recognizes and emphasizes the urgency to eliminate educational disparities. The Minnesota Department of Education (MDE) highlights this as part of the state agency's mission statement. Consistent with this study, MDE defines educational equity as:

> The condition of justice, fairness, and inclusion in our systems of education so that all students have access to the opportunities to learn and develop to their fullest potentials. The pursuit of educational equity recognizes the historical conditions and barriers that have prevented opportunity and success in learning of students based on their races, incomes, and other social conditions. Eliminating those structural and institutional barriers to educational opportunities requires systemic change that allows for distribution of resources, information, and other support depending on the student's situation to ensure an equitable outcome. (2022b)

The MDE's statement indicates that the intent is to improve the situation for those who are disadvantaged, and the strategies and plans must help undo the historical practices that were

direct barriers to achieving educational equity. Accordingly, the study does not examine educational equity from the perspective of horizontal equity (same treatment of students who are similar or alike) or vertical equity (for purposes of fairness, some students need more than others); but rather, the study focuses on equality of educational opportunity—fairness in access to opportunities or to ensure a fair starting point for students of color or disadvantaged backgrounds (BenDavid-Hadar, 2018). However, to determine whether educational equity is achieved or has improved, educational equity as the dependent construct must be well-defined and measurable. Omoeva et al. (2018) suggest common education indicators to measure inequality: "Access and participation, completion, learning, attainment, and resources" (p. 54). Alcott et al. (2018) also suggest learning, participation, and completion as strong indicators for measuring educational equity. Moreover, students need a safe learning environment to allow for full participation, engagement, and learning (Nielsen, 2020). Nielson (2020) argues that diverse classrooms and the interaction with diverse students taking place in an inclusive environment benefit all students. For these reasons, three areas are critical in defining and measuring educational equity in this study: participation, completion, and learning.

For the participation indicator, Omoeva et al. (2018) recommend using the percent of children accessing school to measure the level of participation for students. Similarly, Alcott et al. (2018) suggest the gross enrollment ratio for the participation indicator. In this study, the participation indicator is the attendance rate for Minnesota's K-12 public school districts. The attendance rate is determined by the percentage of students attending more than 90 percent of the days they are enrolled at a school (MDE, 2023f). Students who attend school in a consistent manner are more likely to do well in school and succeed during and after high school (MDE, 2023f).

Omoeva et al. (2018) suggest that the completion rate is a meaningful indicator for educational equity, and in this study's context, it is the graduation rate from the public-school secondary setting. Nielsen (2020) similarly defends educational attainment as a strong indicator of equity: "Graduating from high school on time and with a diploma remains one of the most critical educational objectives for all students" (p. 30). This study uses the four-year cohort graduation rate. Graduation is often a good indication of employment and having a strong path forward after high school (MDE, 2023d).

For the learning indicator, Omoeva et al (2018) recommend the percent of students who achieve the minimum proficiency or passing national exams. Alcott et al. (2018) further argues that this is a strong indicator at the national level. Nielsen (2020) agrees and states that successful learning requires active engagement. In fact, disengagement often have long-term implications for students of disadvantaged backgrounds. Nielson (2020) specifically recommends establishing metrics on standardized tests for achievement of reading and math. As a result, this study will focus on the math and reading achievement rates for the percentage of students meeting or exceeding state standards. In Minnesota, the standard tests are Minnesota Comprehensive Assessments (MCAs) and Minnesota Test of Academic Skills (MTAS) (MDE, 2023e). In summary, the educational equity measure is made up of three indicators to help the study assess and measure educational equity: graduation rate, attendance rate, and learning rate.

Furthermore, in this study, the term—students of color—is defined as students who self-identified in one of the following categories, based on the federal definition of race and ethnicity: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, or two or more races (MDE, 2023a). However, for the American Indian race/ethnicity category, Minnesota takes a more inclusive approach and follows

the state definition and not the federal definition (MDE, 2023a). Students who self-identify as American Indians are counted in the data set. Also, students who self-identify as American Indian and a member of another racial group will be counted in this data set (MDE, 2023a). These students do not need to complete the Indian Student Eligibility Certification Form for Title VI Indian Education Formula Grant Program to be considered American Indian in the State of Minnesota (MDE, 2023a). The term, students of disadvantaged backgrounds, is used in this study to define students who enrolled as English learner, special education, free/reduced price meals, or homeless (MDE, 2023a).

Educational equity in this research is focused on the notion that "everyone should have the same opportunity to thrive, regardless of variations in the circumstances into which they are born" (Cameron et al., 2018, p. 17). To get closer to equality of conditions and outcomes, the state of Minnesota "redistributes" resources and investments to compensate for the existing disparities in the education setting (Cameron et al., 2018). Ilie et al. (2018) advocate for providing additional resources to students of disadvantaged backgrounds. In other words, in order to achieve educational equity, equality of conditions and redistribution of funding and resources are needed. Accordingly, in this research, those indicators are: public funding investment, diversity in the teacher workforce, and access to opportunities for SOCDs. These constructs make up the independent variables in this research.

Public Funding Investment: Participation in the A&I Program

Education finance is a complex and multifaceted based on complicated financial formulas, legislative initiatives, state law, county and school district provisions, and local property tax. Education finance reform has been front and center historically for the state of Minnesota to ensure a more equitable financing system. Odden (2000) argues that school finance

is shifting its focus to providing fiscal adequacy and improving equity. Furthermore, the focus on educational adequacy and equity often lead to achieving significant progress with cross-district fiscal equity (Odden, 2000). Minnesota's history reveals the intentional shift to provide fiscal support for racial integration and reducing educational disparities. In specific, the A&I Program was initiated in the 2013-2014 school year to intentionally "pursue racial and economic integration and increase student academic achievement, create equitable educational opportunities, and reduce academic disparities based on student's diverse racial, ethnic, and economic backgrounds" (Achievement and Integration Statute 124.D.861 of 2013). The goal of the A&I Program is to reduce disparities across school districts, and improve experiences and outcomes for disadvantaged students, including students of color and lower socioeconomic status (Strom, 2021).

However, increased program funding does not guarantee improved educational equity in the school setting, across student populations (National Research Council, 1990). Ilie et al. (2018) argue that for significant improvement and substantial progress with the populations that are disadvantaged in the education setting, large investments are required: "The cost is likely to be far higher because the interventions needed to mitigate the root causes of inequalities, which are historically, socially, and culturally embedded within societies, are more extensive and complex" (p. 108). The A&I Program is an investment strategy to reduce disparities in the educational setting, and yet, these inputs may have very little influence or linkage with outcomes such as improved educational equity. As a such, this study examines whether public funding investments specifically for racial integration and disparities reduction positively affects educational equity.

Access to Opportunities for Students of Color and Disadvantaged Backgrounds: Enrollment/Participation in Rigorous Coursework

Another important factor is the access to opportunities, in specific, the enrollment and participation of SOCDs in rigorous coursework. Do SOCDs have opportunities to enroll and fully participate in rigorous coursework? Nielsen (2020) argues that "equalizing access to high-quality advanced coursework represents a potential lever for reducing disparities in educational attainment" (p. 14). The term "participation" is defined by the completion of at least one rigorous course exam in high school. Based on The College Board, taking Advanced Placement (AP) exams is a good measurement of AP participation (Phillips & Lane, 2021). First-year college grade point average (GPA) and four-year college completion rates for students who completed one to two AP exams are much higher than students who took no exams (Phillips & Lane, 2021; Beard et al., 2019). In Minnesota, AP exams are open to all students. Students may qualify for college credits if they complete AP coursework and/or take the AP course examination (MDE, 2023c). For the International Baccalaureate (IB), exams are only open to IB Program students. Additionally, only students who score 4 or higher will receive college credits at colleges and universities worldwide (MDE, 2023b). For both exams, the state will fully reimburse exams for fee-reduced, low-income students and partially reimburse exams for non-fee-reduced students (MDE, 2023b; MDE, 2023c).

Enrollment in rigorous coursework is defined as the enrollment in one of following courses: AP, Concurrent Enrollment, IB, and Postsecondary Enrollment Options (PSEO) (MDE, 2022g). These courses provide the student with the opportunity to earn college credit while in high school or prepare them for academic success in postsecondary institutions (MDE, 2022g). In school year 2020, the statewide participation rates for AP, concurrent enrollment, IB, and

PSEO are 32%, 4%, 9%, and 32% respectively (MDE, 2022e). Table 1 reflects that the rates for students of color and students who qualify for free or reduced lunch are dramatically lower for PSEO, concurrent enrollment, and other rigorous coursework (with the exception of the Asian/Pacific Islander group). Similarly, Table 2 reflects the rate of rigorous exams completed by student demographic and other categories. The AP and IB exam rates reflect deep disparities between the White population and almost all other racial/ethnicity categories.

Table 1

Minnesota 2020 Rigorous Coursework Student Enrollment Rates

Grades 9-12	Advanced Placements	International Baccalaureate	Postsecondary enrollment options	Concurrent Enrollment
Statewide	32%	4%	9%	32%
White	34%	3%	10%	35%
Asian / Pacific Islander	40%	10%	11%	31%
Two or more Races	30%	5%	9%	26%
Free + Reduced Lunch	19%	6%	7%	22%
Black/African American	22%	9%	8%	18%
English Language Learners	9%	5%	5%	11%
Hispanic or Latino	17%	4%	7%	23%
American Indian / Alaskan Native	11%	3%	7%	16%
Special Education	6%	2%	3%	7%

Note. Source: MDE, 2022e.

Table 2

Minnesota 2020 Rigorous Coursework Student Exam Participation Rate (one or more)

Grades 9-12	AP Exams # of Students	AP Exams % of Students	IB Exams # of Students	IB Exams % of Students
Statewide	18,698	31%	2,396	4%
White	14,131	33%	1,354	3%
Asian / Pacific Islander	1,8125	42%	357	8%
Two or more Races	544	28%	54	3%
Free + Reduced Lunch	2,661	16%	715	4%
Black/African American	1,108	18%	323	5%
English Language Learners	163	6%	99	4%
Hispanic or Latino	1,007	20%	290	6%
American Indian / Alaskan Native	72	9%	17	2%
Special Education	304	4%	47	1%

Note. Source: MDE, 2023b.

In summary, college preparatory courses have been the vehicle for effectively preparing students for college (Huerta et al., 2013). For students of color and/or underserved students, college preparatory courses are even more important for academic success (Huerta et al., 2013). Therefore, this study determines whether access to opportunities in the enrollment and participation of rigorous coursework for SOCDs positively influence educational equity.

Teacher Workforce Diversity: Teachers of Color

There is compelling argument that teachers have a significant role in the classroom, directly affecting student performance and outcome (Nielsen, 2020). In particular, the teacher's experience and racial/ethnic background have important effects on the student's learning experience and outcomes (Nielsen, 2020). A teacher of color is defined as an individual of color,

belonging to a racial or ethnic group or American Indian background, licensed to teach in Minnesota (MDE, 2022f). What happens in the classroom may also significantly affect educational equity, both independently and interactively with public funding investments. Minnesota's K-12 public schools are made up of 34 percent students of color or American Indian background and only four 4 percent of teachers identify as teachers of color or having American Indian background (MDE, 2022c). Research indicate that teachers of color (racially and ethnically diverse backgrounds) are important to students of color and American Indian students; and in fact, having teachers of color benefits all students (The Coalition to Increase Teachers of Color and American Indian Teachers in Minnesota, 2022; MDE, 2022c). In particular, Cobb (2017) argues that white teachers are more likely to uphold a color-blind ideology in the classroom setting, which is counterproductive to dismantling institutional racism and other discriminatory practices. Furthermore, Matsumura et al. (2008) state: "The quality of the classroom climate and teacher-student relationships may be especially critical during students' transition to and through middle school" (p. 294). Consequently, this study examines whether increasing the number of teachers of color positively affects educational equity.

1.3 Purpose and Significance of the Study

This study seeks to determine whether there are relationships between: first, public funding investment and educational equity; second, access to opportunities for SOCDs and educational equity; third, the interaction effect between access to opportunities for SOCDs and public funding investment on educational equity; fourth, teacher workforce diversity and educational equity; and fifth, the interaction effect between teacher workforce diversity and public funding investment on educational equity. The purpose of this study is to better understand existing efforts and their direct impact on educational equity. Are there additional or

pivoting strategies that can be implemented to further advance educational equity in Minnesota? There is consensus that educational equity is important and a priority, however, is the participation in the A&I Program an effective mechanism to eliminate disparities for SOCDs? Therefore, this study determines the effectiveness of public funding investment in achieving educational equity in Minnesota's K-12 public schools through the A&I Program. Additionally, this study seeks to identify specific efforts that positively impact educational equity. These specific efforts are improving access to opportunities for SOCDs and diversifying the teacher workforce.

The significance of this study is to establish an educational equity measure, define next steps for policy change, and identify opportunities to advance educational equity. First, this study defines educational equity in terms of equal opportunity. Based on this definition, a metric can be operationalized to begin evaluating, tracking, and measuring Minnesota's progress on educational equity. This metric will help us establish a baseline (a starting point), and assess ongoing efforts with the goal of making further improvements. This new operational measure may help shape the policy direction and build momentum that we so urgently need to reduce educational disparities. Second, this study is a quantitative analysis examining the relationship between the public funding investment and educational equity to help evaluate the program against its intended objective—improving educational equity. Data helps define the objectives and measure progress, and it also helps inform the program's next steps in the educational equity continuum. Third, this study is an opportunity to advance research in the field of education by suggesting that specific practices or strategies with public funding support can accelerate the state's achievement of educational equity for Minnesota public schools. This research can help inform constituents of the needed public policy to create meaningful change and achieve

educational equity. Minnesota educators, school districts, parents, policy officials, students, and the overall state of Minnesota will benefit from understanding the relationship between public funding investment and educational equity, and the role of other variables to help address widespread educational disparities in Minnesota's K-12 public schools.

1.4 Research Design

This study's methodology is a quantitative, correlational research focusing specifically on the 328 school districts in Minnesota for a time period of three school years, from 2019-2022 for the independent variables, with a delayed effect on the dependent variable (school year 2021-2022). The research explores two matters: first, the relationship between public funding investment and educational equity; and second, whether two other variables (student access to opportunities and teacher workforce diversity) interact with public funding investment to improve or impact educational equity. The method of study uses archival, secondary research data—existing data from MDE and Minnesota Professional Educator Licensing and Standards Board (MN PELSB).

This quantitative research is a correlational study which investigates and describes the relationships between the variables based on data for the independent variables from three school years 2019-2020 (2020), 2020-2021 (2021), and 2021-2022 (2022) and their effect on the dependent variable in school year 2021-2022 (Gravetter & Forzano, 2016). The data analysis will focus on examining the differences between participating school districts and non-participating school districts for the identified three school years. Gravetter & Forzano (2016) suggest correlational research is an effective way of investigating the relationships between variables without manipulation or control. This research determines whether relationships exist between the dependent and independent variables, and attempts to "describe the nature of the

relationships" (Gravetter, Forzano, 2016, p. 348). This research does not go into details to explain the relationships, and most importantly, does not intervene in the study by manipulating, controlling, or changing the variables and respective data (Gravetter, Forzano, 2016).

The research design focuses on understanding the relationship between educational equity and the other variables. Accordingly, this study defines educational equity as the dependent variable, and then collect and examine the data based on this definition. The dependent variable is made up of three components as previously discussed: attendance rate, graduation rate, and learning rate. The data collected and examined will help measure the level of educational equity at each school district in the 2021-2022 school year. Because the level of educational equity is a result of receiving public funding, access to opportunities for SOCDs, and teacher workforce diversity, the effect is delayed and data is focused on school year 2021-2022. Based on the definition of educational equity, this study will calculate an educational equity score for each school district.

Next, the research defines the independent variables based on the constructs already discussed—public funding investment, student access to opportunities, and teacher workforce diversity. School districts that participated in the A&I Program for the most recent three school years will determine the schools that received public funding with the purposes of reducing educational disparities (group one). Three school years (2020, 2021, and 2022) will be examined for the independent variable and their delayed effect on the dependent variable in 2022 to allow for meaningful data to emerge. This approach focuses on school districts that received program revenue for at least three years (2020, 2021, and 2022) allowing for schools to implement plans and execute strategic changes, before seeing overall impacts and results. School districts that have recently joined the A&I Program will not be part of this group. Instead, school districts that

did not receive continuous A&I Program revenue from 2020, 2021, and 2022 will be in group two with other non-participating school districts as part of this research. The purpose of this research approach is to ensure that the school districts received continuous revenue for at least three school years, and received sufficient time to implement and accomplish their A&I Program goals and see results in school year 2021-2022 for improved educational equity.

These participating school districts have a long-term plan and related strategies that might include innovative school enrollment choices, family engagement initiatives, professional development opportunities for teachers and administrators including those who are underrepresented among the licensed teachers or administrators in the district or school, increasing more effective and diverse instructors focused on rigor and college and career readiness for underserved students, and the recruitment and retention of teachers and administrators of color (Achievement and Integration Statute 124.D.861 of 2013). As part of the program requirements, each school district had a detailed budget reviewed and approved by the Commissioner of MDE for the identified three school years (Achievement and Integration Statute 124.D.861 of 2013).

Teacher workforce diversity and student access to opportunities constructs will also be defined and operationalized to measure the opportunities for SOCDs in public schools, and the level of diversity of the teacher workforce. Teacher workforce diversity will be defined and measured by the number of teachers of color during the three school years: 2020, 2021, and 2022. The student access to opportunities construct will be defined by the enrollment and participation in rigorous coursework for SOCDs for the same three years identified. This construct is measured by the average numbers of SOCDs who are enrolled in at least one rigorous coursework and the average number of SOCDs who completed at least one rigorous

coursework exam in high school for the same three school years. SOCDs this group are self-identified in one of the following categories: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, Two or more races, English learner, special education, or free/reduced price meals.

1.5 Research Question

Can Minnesota's K-12 public school districts achieve educational equity through public funding investment, teacher workforce diversity, and improved access to opportunities for students of color and disadvantaged backgrounds?

1.6 Limitations of the Study

A limitation of the research is that the study focuses on determining whether there are relationships between the variables, and does not focus on the analysis of the content of each school district's A&I Program plan. For example, this research does not examine whether a school district met its own racial integration program objectives. Additionally, this research is not a longitudinal study. The research is limited to comparing the data between A&I participating and non-participating school districts for the identified three years. Although the data reviewed as part of this research spans across three school years (2021, 2021, and 2022) the study does not examine school districts over time or educational equity over time. A longitudinal research design involves measuring the variable and in the same group over a period of time (Gravetter & Forzano, 2016). Examining longitudinal data my indicate different results and implications for educational equity.

Furthermore, the study does not examine educational equity from the perspective of horizontal equity (same treatment of students who are similar or alike) or vertical equity (for purposes of fairness, some students need more than others); but rather, the study focuses on

equality of educational opportunity—fairness in access to opportunities or to ensure a fair starting point for students of color or disadvantaged backgrounds (BenDavid-Hadar, 2018). For this reason, the educational equity measure will be limited to three factors that will help determine the school district's level of educational equity: attendance rate, learning and engagement rate, and graduation rate for SOCDs.

This is a quantitative study and there are limitations with this approach. In quantitative studies, a regression analysis can only determine whether a relationship exists between variables. The regression analysis does not examine in depth or describe in detail why and how the relationship exists. Moreover, this study uses secondary data which is also limiting. In specific, the categories of race and ethnicity do not provide the level of detail that may be meaningful, and this level of detail deserves its own research. For example, Asian Americans are lumped together as a single homogenous group (Garcia & Mayorga, 2017). The specific limitation is that the result of treating Asian Americans as a single group does not portray all Asian Americans accurately. In fact, the data and results can be misconstrued and misleading. Garcia and Mayorga (2017) suggest that Asian Americans are stereotyped as the model minority and certain Asian American groups do not benefit from this stereotype. In future research, there may be an opportunity to disaggregate the data for the Asian American group. Analyzing the data in this way will be meaningful as the different groups have different experiences and varying educational performances (Garcia and Mayorga, 2017).

Lastly, Critical Race Theory scholars are critical of quantitative studies for it often reflects a "superficial understanding of racism and perpetuate white supremacy" (Garcia and Mayorga, 2017, p. 236). This study attempts to determine whether relationships exist between variables, with clear acknowledgment that further exploration and examination of those variables

will be needed in subsequent research. In other words, this study is the starting place, and perhaps serves as a road map, for the work that lies ahead to better understand educational equity and how Minnesota addresses educational disparities for SOCDs.

CHAPTER 2

2. LITERATURE REVIEW

This chapter summarizes the discussions in current literature and theory related to educational disparities for SOCDs. The Critical Race Theory and Stakeholder Theory serve as the theoretical foundation for this study—in understanding the current environment that compounds educational disparities; to developing strategies from the stakeholder perspective to dismantle the existing infrastructure; for effectively respond to constituencies and building a path forward to reform Minnesota K-12 public schools. The current literature agrees that additional school funding minimally helps improve racial integration, educational equity, and academic achievement. Also, there is agreement in current literature that other reform or pivoting of current strategies are needed to achieve real change in the school setting to eliminate educational disparities for SOCDs. First, this literature review examines current research on the relationship between increased school funding and improved racial integration or student achievement. Next, this literature review focuses on the importance of enrollment and participation in rigorous coursework for students of color and disadvantaged backgrounds. Lastly, this literature review explores the relationship between teachers of color and educational equity.

2.1 School Funding and Racial Integration

Current literature captures both sides of the argument, in terms of the relationship between increased or more equitable school funding and academic achievement for SOCDs. Some scholars argue that there is a direct relationship between increased funding and improved academic achievement; whereas, other scholars argue that there is no significant relationship between the two. Similarly, current literature reflects conflicting viewpoints on the importance of racial desegregation in school settings. The discussions suggest that increased school funding has

the intent to increase racial integration to positively impact student achievement or equalize resources and opportunities; however, the actual impact is minimal or limited, and therefore additional strategies are needed to significantly reduce educational disparities. Based on the literature review, the type of spending or pattern of spending have a more evident relationship with racial integration and student achievement.

Wenglinsky (1998) suggests that financial equalization efforts do not address educational disparities within schools. The concept of finance equalization began in the 1960s and it was the attempt to increase funding to low-spending school districts to help reduce educational disparities (Wenglinsky, 1998). The result was to address inequities between school districts and not necessarily the inequities within school districts (Wenglinsky, 1998). More importantly, increased funding may help improve the average student achievement overall, but may also increase disparities between students of high and low socioeconomic status (Wenglinsky, 1998). Wenglinsky (1998) hypothesized and confirmed through his research that there is no relationship between a school district's expenditures and the mean school achievement. However, Wenglinsky's (1998) confirmed that some types of spending affect the social distribution of achievement; in specific, investing in instructional budgets may improve the distribution of student achievement. The research highlights the importance of funding for specific investments and strategies within each school district. Simply equalizing or increasing funds across school districts does not necessarily reduce disparities between students of different backgrounds (Wenglinsky, 1998).

In the same vein, Sosina and Weathers (2019) examine the relationship between racial and socioeconomic segregation and expenditure disparities across 15 years of data from the School Funding Fairness Data System, a federal data source that provides information about

finance and demographics over time. The study seeks to understand how segregation impacts educational disparities based on its funding and expenditure decisions (Sosina & Weathers, 2019). Five expenditure categories were assessed and measured: administration, infrastructure, instruction, social support services, and all other spending (Sosina & Weathers, 2019). The scholars found evidence that there is a relationship between racial segregation and racial disparities in school district spending when analyzed between school districts (Sosina & Weathers, 2019). Based on their study between 1999 and 2013, the total per pupil expenditures disfavored predominately the Black school districts and Latinx school districts compared to the predominately White school districts (Sosina & Weathers, 2019). Specifically, for Black and Latinx school districts, the per pupil expenditures exceeded the per pupil expenditures for the White school district for the administration, instruction, and social services categories (Sosina & Weathers, 2019). However, for the infrastructure category, White school districts have a higher per pupil expenditure compared to Black and Latinx school districts (Sosina & Weathers, 2019). The study reveals that states are spending more in Black and Latinx school districts relative to the White school districts over time (Sosina & Weathers, 2019). For this reason, the scholars find that there is no significant relationship between racial socioeconomic segregation and racial disparities in school district spending (Sosina & Weathers, 2019).

However, the results indicate that spending patterns matter and how school districts spend money will influence outcomes that will either widen or close the gaps in educational disparities (Sosina & Weathers, 2019). The scholars suggest that the linkage between racial segregation and Black-White disparities in spending can be explained in many ways including resource constraints—changes in personnel and hiring practices (Sosina and Weathers, 2019). In particular, there is evidence that changes in the instructional and other spending categories

negatively impacted the Black school district, and infrastructure spending changes adversely impacted the Latinx school district (Sosina & Weathers, 2019). The study's findings reveal that school district spending patterns are critical in understanding racial disparities in educational opportunities (Sosina & Weathers, 2019).

Conversely, when exploring the importance of desegregation in schools and academic achievement in high school specifically, Rumberger and Palardy (2005) suggest that "whom you go to school with matters" (p. 22). Specifically, socioeconomic matters more than racial composition of schools. The scholars further argue that a school's socioeconomic status is a more important indicator of student achievement than an individual student's socioeconomic status (Rumberger and Palardy, 2005). Nonetheless, the scholars determine that school resources do not have a strong account for the effects of a school's socioeconomic status (Rumberger and Palardy, 2005). The factors that affect a school's socioeconomic status are school policies and practices (Rumberger and Palardy, 2005). In particular, teacher expectations and the academic climate impact the school's socioeconomic status (Rumberger and Palardy, 2005). The scholars conclude by arguing that desegregation, specifically socioeconomic integration, is the best way to achieve equal educational opportunities (Rumberger and Palardy, 2005). Parents and students with power often advocate for more challenging curriculum compared to less influential and affluent families (Rumberger and Palardy, 2005). As a result, students with a lower socioeconomic status who are in school with students who are more affluent and powerful, benefit from the more challenging coursework (Rumberger and Palardy, 2005). This argument transitions this study to examine the importance of the classroom climate and rigorous coursework for SOCDs.

2.2 Rigorous Coursework for Students of Color and Disadvantaged Backgrounds

The current body of literature discusses the importance of rigorous coursework or Advanced Placement (AP) courses for SOCDs. In specific, existing research highlights the importance of increasing the enrollment numbers for SOCDs; however, the strategies to increase enrollment are not enough. Additional strategies and tactics are needed to address the educational disparities for SOCDs specifically the need to provide effective supports and quality instruction. The literature argues for both increasing enrollment and improving performance for SOCDs in rigorous courses. The underlying argument is to establish an optimal classroom environment, positively impacting the level of learning and performance for SOCDs.

Phillips and Lane (2021) conducted a recent study focusing on whether improving AP participation and performance is an effective strategy for reducing disparities based on race, ethnicity, and socioeconomic status. In this study, AP participation is a measure based on the number of AP exams a student completed in high school—one, two, and three or more (Phillips & Lane, 2021). Phillips and Lane (2021) measure AP performance based on a student's average AP exam score. The result of their study reveals that students who took two, three, or more exams had greater odds of graduating from postsecondary institutions. Moreover, students who took three or more exams had greater chances of doing well in postsecondary institutions, compared to students who just took one exam (Phillips & Lane, 2021). Participants with an average AP exam score of 2, 3, 4, or 5 had greater chances of graduating from four-year institution, compared to those participants with an average AP exam score of 1 (Phillips & Lane, 2021). Specifically, White and Asian non-low income students have better immediate (enrollment in postsecondary institution) and long-term (graduation from postsecondary

institution) outcomes compared to non-low income students who are Black and Latino (Phillips & Lane, 2021).

In summary, participating in AP courses improves academic outcomes for SOCDs; AP performance is also a good indicator of success in the postsecondary setting (Phillips & Lane, 2021). More importantly, Latino and Black students participating in AP courses experience the most positive impact in terms of postsecondary outcomes (Phillips & Lane, 2021). Consequently, AP enrollment does not provide a clear indication or strong evidence of success beyond high school. Instead, the number of AP exams and exam scores are better indicators of success and solid predicators of college outcomes compared to AP enrollment (Phillips & Lane, 2021). And yet, the problem is more complex. Primarily, high achieving SOCDs are less likely than White, non-low income students to be placed in AP courses (Phillips & Lane, 2021). Furthermore, based on the scholars' research, "52.47% of students of color with the potential to succeed on an AP exam…did not take an exam in that subject" (Phillips & Lane, 2021, p. 472). Secondarily, there are structural differences between the schools for SOCDs, and White non-low income students (Phillips & Lane, 2021). To outline just a few, there are other factors including curriculum, delivery of content, and quality of teaching that all impact students of color/disadvantaged backgrounds in completing AP exams (Phillips & Lane, 2021). Evidently, one quarter of high schools with highest representation of Black, Latino, Native American, and Alaskan Native students did not offer Algebra II and one third did not offer Chemistry in 2014 (Phillips & Lane, 2021). The scholars conclude that improving high school AP participation and performance for low-income White, Black, and Latino students is an effective strategy for narrowing the gap specifically for disparities in college outcomes.

On the other hand, Roegman et al. (2019) conducted a study to examine five school districts participating in initiatives to improve inequities in AP participation for students of different racial/ethnic groups. The scholars focused specifically on the goals, strategies, and outcomes for each school district for students overall, and separately, students from different racial/ethnic backgrounds (Roegman et al., 2019). The results of the study indicate that each school district had their own unique goals and strategies, which increased access for all racial/ethnic groups but those efforts did not result in reduction of gaps for over or under-representation in AP participation (Roegman et al., 2019). In particular, across all school districts, there was increase in access for all racial/ethnic groups but Black students continued to receive the lowest scores in the AP courses (Roegman et al., 2019). Therefore, the study concluded that while implementing initiatives to increase access to AP courses is important, it is not sufficient to actually achieve equity. In other words, access and opportunity is not enough. In this study, AP enrollment numbers increased for Black and Latinx students but they continue to receive the lowest average scores and low percentages of exam taken (Roegman et al., 2019). Consequently, school districts should implement policies that increase access, maintain performance, and improved outcomes for SOCDs in AP courses.

To further the argument of Roegman et al., Phillips and Lane (2021) advocate for school, teacher, and students supports. School supports rely on using best practices, data-driven improvements, adequate equipment, and supplies in order to increase the enrollment and level of participation in AP courses for SOCDs (Phillips & Lane, 2021). Teacher supports reflects the importance of high-quality teachers—professional development and active, ongoing learnings—and the direct impact for all students, especially SOCDs (Phillips & Lane, 2021). Lastly, student

supports highlight the need to offer additional resources and time commitment provided to students: mock exams, exam-fee subsidies, and study sessions (Phillips & Lane, 2021).

Accordingly, Matsumera et al. (2008) argue that the quality of the classroom climate and academic rigor aid student learning. Specifically, the quality of the expectations that teachers hold for students also play a large role in the classroom climate (Matsumera et al., 2008). A major argument in Matsumera et al. (2008) is centered around the quality of student participation which requires teachers to support and effectively encourage students to participate and explain their contributions by asking rigorous questions. SOCDs rely on a supportive teacher and an environment that allows for high level of engagement and participation. In this way, Matsumera et al. (2008) further the argument of Roegman et al. (2019) suggesting that increased enrollment in AP courses must be met with an effective infrastructure to better support and create a culture of high levels of participation and engagement.

Agreeably, Cartagena and Slater (2022) conducted a case study revealing that transformative leadership practices help establish a culture of inclusion which addresses the cultural inequities in a classroom setting, and ensures success of students of color in AP courses. The scholars examine the role of transformative leadership to implement systemic changes in the AP program to encourage and support students of color (Cartagena & Slater, 2022). Transformative leadership in this research is critical to advancing social justice and was analyzed based on teachers promoting a “shift in mindset; the participants were driven to create change because they had lived the experience of inequity; they shared ownership through validation of the work of others, and they were grounded in community” (Cartagena & Slater, 2022, p. 124). Cartagena and Slater (2022) argue that educational leaders who recognized or had experienced inequity are more motivated to be the leaders of change. For this reason, leaders of change are

often teachers of color. The consensus in the literature review highlights the great need to meet the increased enrollment of students of color/disadvantaged backgrounds with establishing a classroom environment that offers effective supports to ensure successful performance. Thus, the literature review pivots to discuss the importance of teachers of color and their role in advancing educational equity.

2.3 Teachers of Color and Educational Equity

Current scholars strongly argue that there is a positive relationship between increased teachers of color and educational equity. The highlight of many discussions is the necessary pursuit to diversify the teacher workforce and its direct impact on educational equity; and yet, how school districts achieve this goal is the very dilemma. There is a lack of diversity currently in the teacher workforce due to several factors including challenges with recruitment and licensure, and lack of interest in the teaching profession (Little et al., 2010). Retention of teachers of color continues to be a challenge, and yet, critical in establishing a positive trajectory for the growth of teachers of color, educational equity, and overall student achievement.

Hwang et al. (2022) examine the relationship between same race/ethnicity teachers and student achievement, and whether teachers of the same race/ethnicity as the student play an important role in academic achievement. Based on data from the Indiana Department of Education, for students grades three through eight from 2010-2011 to 2016-2017 academic years, the scholars find that there is a positive relationship between same race/ethnicity teachers and student achievement predominately with Black students (Hwang et al., 2022). There are many reasons for this argument, including but not limited to: a teacher who understands a student's culture and background may be better positioned to promote or motivate student's learning; teachers may serve as role models to further influence a student's actions and achievement; and

teachers who know the student's cultural background are more likely to communicate effectively with the student (Hwang et al., 2022).

Furthermore, the scholars find that the links between same race/ethnicity teachers and student achievement are greater for students at the elementary school level (Hwang et al., 2022). Younger students and the relationship with their teachers tend to be stronger compared to students who are older (Hwang et al., 2022). The positive relationship between younger students and their teacher has implications for the remainder of the student's academic journey (Hwang et al., 2022). The results are even more significant for Black students (Hwang et al., 2022). Hwang et al. (2022) summarize the challenge with addressing this issue: "Unfortunately, the majority of Black students lack opportunities to study with Black teachers since Black teachers are considerably underrepresented in the U.S. teacher workforce" (pp. 18-19). Their research indicated that only 37% of Black students were given the opportunity to study with the same race/ethnicity teachers at least once between grades three to eight (Hwang et al., 2022). Not surprisingly, the rate is 98% for White students (Hwang et al., 2022). Little et al. (2010) examine how teaching has significantly shifted in the recent decades and how that shift has impacted educational opportunity and academic outcomes. Similarly, Lau et al. (2007) articulate that there is "significant disparity between the proportion of students of color and the proportion of teachers of color" (p. 28). Specifically, Little et al. (2010) highlight the challenges of the teacher workforce, noting that the teacher demographics do not match those of the student population and their willingness to teach students from different backgrounds. And yet, the scholars argue that most individuals working toward a teaching licensure expressed interest for teaching students who are more like them (Little et al., 2010). With an underrepresentation of teachers of color in the workforce, students of color are at a clear disadvantage.

Nonetheless, Achinstein et al. (2010) note that teachers of color report greater job dissatisfaction and overall higher turnover compared to White teachers. Thus, the scholars argue that the retention of teachers of color is critical to grow their representation in the teacher workforce (Achinstein et al., 2010). The data further indicates that retention rates for teachers in urban schools with students of color and low socioeconomic status are more challenging and noticeable (Achinstein et al., 2010). This is often the catalyst for other challenges related to curriculum, organizational, and instructional costs (Achinstein et al., 2010). The research finds that teachers of color only make up 16% of the nation's teaching workforce in all schools (public and private) when 38% of K-12 students were people of color (Achinstein et al., 2010). Based on data from 2004-2005, turnover rate for teachers of color was 19.4% overall, with Black teachers' turnover rate at 20.7%, compared to White teachers at 16.4% (Achinstein et al., 2010). The turnover rate is especially concerning given that teachers of color are underrepresented in the field of teaching to begin with. Consequently, Archinstein et al. (2010) suggest that "Given the cultural gap between teachers and students, the growing population of students of color, and the recent decline in teachers of color, we are seeing a widening of the cultural gap" (p. 94). The authors suggest that there should be strategies to enhance and retain teachers of color at urban schools (Achinstein et al., 2010). The strategies offered include: "humanistic commitments"—encouraging teachers to give back to the communities to support communities of color and disadvantaged backgrounds; providing better support system for teachers of color including fostering a sense of belonging and inclusiveness in decision making; and encouraging innovative teaching approaches outside the standard, traditional teaching models (Achinstein et al., 2010).

In summary, the current literature discusses the importance of school funding for programs that help reduce educational disparities or are critical in the academic achievement of

students of color, but there is no evidence of a positive relationship between increased or more equitable funding and improved educational outcomes for SOCDs. Specifically, there is a lack of discussion in Minnesota about the relationship between the participation in the A&I Program and educational equity. Furthermore, there is limited discussion about the relationship between increased enrollment and participation in rigorous coursework for SOCDs and educational equity within the secondary setting in Minnesota. Current literature discusses the relationship between AP participation and performance and postsecondary enrollment and achievement, but not necessarily the relationship between AP enrollment/participation and educational equity in public secondary schooling. However, current literature argues the need for more than just increasing enrollment; public schools also need an infrastructure in place to allow SOCDs to have access to rigorous coursework and perform well in those classroom settings. Lastly, there are very few empirical studies focused on measuring and assessing educational equity in Minnesota's K-12 public schools.

For these reasons, this study fills the gap in the current literature in several ways. First, this quantitative analysis examines the relationship between public funding investment through the A&I Program and educational equity to help evaluate the program against its intended objective—reducing educational disparities. Second, this research develops an operational measure for educational equity based on three components—attendance rate, learning rate, and graduation rate. Third, this study explores the relationship between teacher workforce diversity and educational equity, and the relationship between access to opportunities for SOCDs in the enrollment and participation of rigorous coursework and educational equity for the purposes of identifying concrete action items to effectively eliminate educational disparities. Lastly, this study explores how teacher workforce diversity and student access to opportunities interact with

the public funding investment and educational equity. With this opportunity, the study intends to advance research in this field by suggesting that specific practices—increased teachers of color and increased enrollment and participation in rigorous coursework for SOCDs—may help the A&I Program accelerate the state's achievement of educational equity for Minnesota public schools.

2.4 Theoretical Framework and Hypotheses

The Critical Race Theory (CRT) and Stakeholder Theory serve as the theoretical underpinnings of this research. First, CRT emphasizes that school funding, academic policies and practices, and the overall public-school infrastructure are based on institutional and structural racism. Second, currently the education system is operating on a color-blind ideology where policies and practices often have the perception of neutrality; but in reality, it does nothing to change the existing racist structures and institutions. In fact, these color-blind approaches do not benefit anyone, and decelerate the achievement of educational equity for SOCDs. Instead, Stakeholder Theory argues that the focus should be on creating value within the classroom setting overall, and viewing education as a collective responsibility to further a greater good. Third, there is a great need for bold strategies to intentionally move beyond Affirmative Action initiatives; and instead, provide approaches to reflect the experiences, voices, and realities of teachers of color and students of color that benefit all stakeholders.

The guiding premise of CRT is that race is a social construction, and that there is great need to change the existing frameworks and arrangements to transform how a diverse society should work together through dialogue, integration, interaction, and reform (Ortiz & Jani, 2010). CRT began in the late 1970s by legal scholars—Derrick Bell, Kimberlé Crenshaw, and Richard Delgado (Civic Way, 2023; Ross, 2010). The initial intent was to highlight the links between the

legal system and racism (Civic Way, 2023; Ross, 2010). From there, CRT spread to other disciplines pushing for truth of the American history (Civic Way, 2023). CRT was applied to the educational field, most notably by Gloria Ladson-Billings and William Tate in 1995 (Ross, 2010). The scholars discussed the "enduring educational inequities in the US education," and argued that race continues to determine the inequity in the U.S. The scholars' primary argument is that property rights continue to guide educational structures as opposed to human rights. As a result of the intersection of race and property, White people have achieved status and privileges, while disadvantaging and excluding all others from these privileges and opportunities (Ross, 2010). Racism and disparities are built upon this very concept and continues to permeate in society in a recurring manner to establish solid systems of discrimination in law, education, media, and institutions (Ross, 2010).

CRT underscores that the world we live in today, in which school funding, segregation, teachers, curriculum, and the overall infrastructure of education is based on systemic and institutional racism (Ladson-Billings, 2016a). Furthermore, Ladson-Billings (2016a) argues that "school desegregation has been promoted only in ways that advantage Whites" (p. 27). The incremental approach to racial integration and equity have resulted in minimal impact. Racism is normal in our everyday world (Litowitz, 2016; Ladson-Billings, 2016b). Even more important is that efforts of affirmative action or segregation often fail to advance the interest of individuals of color (Litowitz, 2016). In fact, some would argue that these policies and efforts directly benefit White students. Taylor (1998) articulates Derrick Bell's theory of interest convergence: "the interest of blacks achieving racial equality have been accommodated only when they have converged with the interests of powerful whites" (p. 123). The current study examines those school districts that participated in the A&I Program to determine whether the increased efforts

in racial integration have in fact resulted in educational equity. The popular assumption is that increased funding leads to some sort of improvement. However, this study hypothesizes that liberal racial integration approaches are ineffective, and that soft policies and trivial school projects will not achieve the change we need for genuine educational equity. The attempts of racial integration across Minnesota's K-12 public school districts have not been as successful as we hope; instead, "People of color can only achieve limited success under the current system" (Litowitz, 2016, p. 295). For this reason, the study hypothesizes that participation in the A&I Program does not positively impact educational equity. There is a recognition of the well-meaning intent behind the A&I Program; however, the impact is minimal and ineffectual.

Hypothesis 1

Public funding investment through the A&I Program has no effect on educational equity for Minnesota K-12 public school districts.

Furthermore, CRT challenges the concept of color blindness and emphasizes the importance of dismantling policies and practices that are race neutral. Color blindness is a strategy to uphold the current structure of White power and advantage (Sleeter, 2017). Color blindness is founded on the argument that advancing the rights or opportunities of one group will hinder or harm another group, thus, resulting in race discrimination (Minda, 1995). Chapman (2023) states, "Educational spaces are saturated with colorblind racism…It constricts the learnings and development of students of color and maintains white privilege by further marginalizing students of color in academic settings" (p. 96). Color blindness does not support affirmative action because the framework and methodology would not be based on individual merit; instead, it would result in race discrimination and not formal equality (Minda, 1995). McGhee (2021) challenges this concept of color blindness and argues that color blindness put

into practice leads to more racism: “Color blindness has become a powerful weapon against progress for people of color” (p. 230). Sleeter (2017) agrees and states that White people fear any changes in the system will adversely impact them in a personal way. In other words, many argue that more teachers of color will mean losses for White teachers and White students. McGhee (2021) shares that the zero-sum paradigm is a lie:

> …if you’ve spent a lifetime seeing yourself as the winner of a zero-sum competition for status, that you would have learned along the way to accept inequality as normal; that you’d come to attribute society’s wins and losses solely to the players’ skill and merit. You might also learn that if there are problems, you and yours are likely to be spared the costs. (p. 205)

Historically, people of color have been denied rights and benefits, allowing White people to obtain and maintain the advantage to succeed and achieve economic superiority (McGhee, 2021). Suddenly, society now wants a level playing field—based on equality and neutrality. To move forward without accounting for the past and present, is suggesting that the systemic and institutional failures magically fixed themselves overnight without remedy and repair. More importantly, the denial of living in a racist world will leave students without the skills needed to manage, grow, and excel in a multicultural, global world (McGhee, 2021). Acknowledging the historical experiences of people of color and challenging the colorblind approaches in our institutions will benefit our children and the upcoming generations. Leonardo (2016) argues that scholars and educators analyze from their worldviews for a white audience and therefore any discussion or acknowledgement of racial understandings moves forward at a sluggish pace. To build momentum and accelerate the elimination of educational disparities, it requires challenging color-blind educational policies and practices.

CRT proposes that instead of color-blindness, race consciousness should be a priority (Minda, 1995). To advance race consciousness in the educational setting requires awareness of the communities in America directly linked to race (Minda, 1995). Historically, these communities have not been treated equally, and without understanding and acknowledging the historical treatment and experiences, the communities will continue to endure racism, discrimination, and inequity in present day (Minda, 1995). The deconstruction of the color-blind ideology is critical for eliminating racism and educational inequity (Minda, 1995). Through race consciousness, self-identity surfaces to emphasize the importance of being different from others (Minda, 1995). The ultimate goal is to challenge the white society directly and undermine the White privileged status (Minda, 1995). There is an illusion that there are cohesive and unified interests between White and all other communities. Furthermore, there is a façade that is often articulated that institutional policies and practices are fair and neutral (Minda, 1995). Minda (1995) argues that Whites cannot see it any other way.

The CRT argument on the importance of race consciousness applies in Minnesota's K-12 public school setting. Most salient is McGhee's (2021) articulation of the benefits of diversity in the classroom: "…when members of a group notice that they are socially different from one another, they change their expectations. They anticipate differences of opinion and perspective. They assume they will need to work harder to come to a consensus" (p. 280). Students will work harder in classrooms of diversity, with improved critical thinking and problem-solving skills, resulting in better outcomes (McGhee, 2021).

R. Edward Freeman in 1984 introduced Stakeholder Theory, focusing on creating value for all the organization's key constituents (Freeman et al., 2020). Stakeholder Theory is centered on creating value and managing the organization effectively by: establishing and elevating

business-customer-constituent relationships, being responsible and accountable for all actions and their effects on the community and surrounding environment, and performing practices that champion ethics and responsiveness to its constituents (Freeman et al., 2010). Freeman et al. (2010) argue that stakeholder capitalism is "based on freedom, rights, and the creation by consent of positive obligations…Rather than focusing on individuals in competition over limited resources…stakeholder capitalism focuses on individuals voluntarily working together to create sustainable relationships in the pursuit of value creation" (p. 280). In other words, Stakeholder Theory holds us accountable to something greater than profit-making and individual self-interest, and the theory underscores the importance of systems thinking. Stakeholder Theory applied in the education setting brings a very sharp perspective centered on value creation that benefits the larger system and future generations. Stakeholder Theory strengthens the argument for classroom diversity and increasing access to opportunities for SOCDs because the value created from diversity outweighs the benefits of having formal equality in the education system. Freeman et al. (2010) adds:

> Rather than argue over whose rights trump whose, this principle acknowledges that a large cast of stakeholders is necessary to sustain value creation…There may be specific situations in which privileging the rights of one group can benefit others in the long term…" (p. 282)

Stakeholder Theory is pertinent in advancing educational equity by shifting our attention on creating new value based on diversity in the classroom, school, school district, and the larger community (Crane, 2020). Moreover, it is understanding the consequences of actions that deeply impact the community and overall education system. In this case, the lack of educational equity and the consequences of doing nothing to change it has long-lasting, adverse impacts that create

more harm than good. The mental shift is moving away from self-interest and instead creating value through a shared understanding of educational equity (Freeman et al., 2010).

In specific, Freeman et al. (2010) agree with McGhee, arguing that self-interest is not the only motivation and indicator of success, but rather that the interaction with others can push progress and innovation in many new ways that benefit all students at a larger, long-term scale. To take it a step further, the public school system has an obligation to the community to pursue and achieve educational equity. The Stakeholder Theory argument opposes the zero-sum game in which there must be a winner and a loser. Instead, there is benefit for all students in increasing access to opportunities for SOCDs to diversify the classroom setting. Freeman et al. (2010) argues: "Instead of trying to find and create arguments for one group's rights to trump the rest, engaging stakeholders in creating as many win-win situations as possible lies at the heart of creating sustainable value" (p. 282). As such, the next two hypotheses reflect the criticality of increasing the number of enrollments for SOCDs for rigorous coursework, and the ability to provide effective supports and resources for those students to fully participate and complete rigorous coursework exams.

Hypothesis 2

Increased access to educational opportunities (enrollment and participation) for students of color and disadvantaged backgrounds positively affects educational equity in Minnesota's K-12 public school districts.

Hypothesis 3

There is a positive interaction effect between access to educational opportunities for students of color and disadvantaged backgrounds and public funding investment on educational equity.

Moreover, Freeman et al. (2010) emphasize the importance of collective responsibility in Stakeholder Theory to establish a more resilient community and innovative marketplace. Simply put, there is a legitimate rationale to focus on unmet opportunity in the education setting, rather than viewing the challenges of educational equity as a zero-sum game especially as we consider teacher workforce diversity. In particular, Stakeholder Theory highlights the importance of the responsibility principle and the acceleration of individual responsibility towards a greater good (Freeman et al., 2010). Responsibility interacts with opportunity in this process, and the response to this interaction creates value that expands and broadens across the stakeholder enterprise (Bosse et al., 2022). As such, this idea of taking responsibility and responding to this very opportunity then becomes a catalyst for change (Bosse et al., 2022).

In this study, the argument is that there needs to be collective action and an acknowledgement that we need to do better and more to increase the number of teachers of color for the benefit of the next generations. Bosse et al. (2020) describes the power of responsibility and the immediate and long-term implications at a larger scale:

> We view responsibility as caring for the outcome of that stakeholder, such as customer well-being, community access to water, or an absence of child laborers in the supply chain…Consequently, this action and answerability creates stakeholder expectations which might then also increase the entrepreneur's responsibility down the road. (p. 6)

To apply this in the education setting, hiring a teacher of color to better serve students of color will have a positive impact on that student of color improving their well-being. As a result, this student is successful in the academic setting, widening opportunities professionally down the road. With achievement, also comes reciprocal responsibility; thus, feeding the responsibility principle continuum of caring for current and future students and their outcomes. In fact, if this

takes place, the responsibilities of other stakeholders (e.g., other school districts, school boards, and schools) are likely to increase (Bosse et al., 2022).

Increasing teachers of color in the public-school setting has been an effort admired by many scholars and practitioners. Litowitz (2016) supports the concept of increasing teachers of color based on the premise that women and minorities "see the world differently—they see sexism and racism where dominant groups cannot. Minorities make better race-relations scholars (and law professors) because they have experienced racism first hand" (p. 295). Teachers of color offer different perspectives that challenge and strengthen a student's understanding of the world and approaches in education. However, what exists now is a teacher workforce that is predominately White—that often exert color-blind ideology and interact with practices that are considered invisible structural racism (Cobb, 2017). Specific to retention, Andrews et al. (2019) argue that the challenge of retaining teachers of color are based on many factors including "screening-out" teachers of color, and having toxic environments that lead to teachers of color feeling disrespected and "de-professionalized" (p. 8). CRT argues that the school systems are built upon systemic racism, and the teacher workforce is designed to uphold that system (Sleeter, 2017). Presently, students in these classes do not have the opportunity to challenge the color-blind practices because these classrooms are led by White teachers who uphold a color-blind ideology and do not see it any other way.

However, scholars would agree that the benefits of having teachers of color are immediately evident and offer lasting impacts. Teachers of color foster "future citizens who have cross-cultural relational skills, a disposition of cultural humility, and a critical consciousness to operate differently in the world having reflected upon their own stereotypes and biases" (Andrews et al., 2019, p. 9). CRT advocates for advancing the voice of the "other" in the

educational setting (Ortiz & Jani, 2010). The voice of the other is capturing the lived experiences of people of color and disadvantaged or marginalized backgrounds. Ortiz and Jani (2010) outline the importance of this work in the educational setting: first, it serves as a way to heal and empower, focusing on the process and not necessarily the outcome; second, the voice of the other may help identify resistive behaviors, learning how to engage in transformative resistance instead of destructive resistance; lastly, the voice of the other captures a counter-story, challenging the White culture and the existing master narrative and its norms. To put it differently, story-telling provides a way for the White population to "enrich their own reality" (Parker, 2003, p. 190; Delgado, 1989, p. 2439). McGhee further argues, "We need leaders who see color, who recognize the profound impact social hierarchies have had and continue to have on our national well-being, and who create new visions for how we can recognize our American diversity as the asset that it is" (p. 279).

Accordingly, it is all too important to increase the representation of teachers of color in classrooms and school districts. The benefit really is for all students and not just students of the same race and ethnicity. Parker (2003) argues that using the act of storytelling, the White majority should be interested in acquiring "the ability to see the world through others' eyes" because it provides an added perspective that add richness to their world vision (p. 190; Delgado, 1989, p. 2439). Other benefits include the potential of boosting academic performance of students of color, offering more culturally responsive and relevant teaching, and increasing the support of students of color to improve outcomes (Andrews et al., 2019). McGhee (2021) suggests that offering diverse perspectives and viewpoints result in more flexibility and creativity in thinking and problem solving. Therefore, action is needed to uproot the existing framework and traditions we hold onto so dearly.

Hypothesis 4

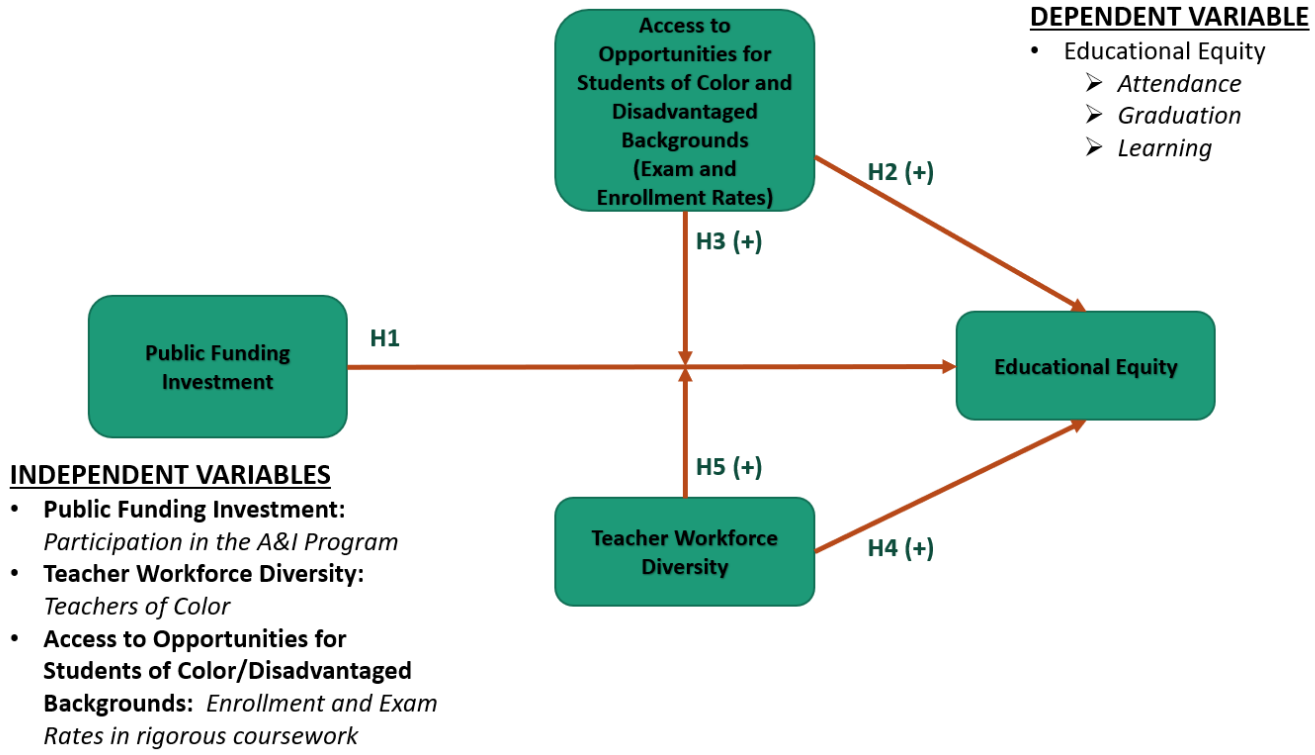
Teacher workforce diversity positively affects educational equity for students in Minnesota's K-12 public school districts.

Hypothesis 5

There is a positive interaction effect between teacher workforce diversity and public funding investment on educational equity.

Figure 2

Conceptual Model



CHAPTER 3

3. METHODOLOGY

This study's methodology is a quantitative, correlational research focusing specifically on the 328 school districts in Minnesota for a time period of three school years (2020, 2021, 2022) for the independent variables, with a delayed effect on the dependent variable (school year 2021-2022). This chapter discusses the methodology including the research design and rationale; target population and sample selection; data collection method, variables, and operational definitions; validity and reliability of measurement, data analysis; and methodology limitations. This methodological approach seeks to answer the research question: Can Minnesota's K-12 public school districts achieve educational equity through the participation of the A&I Program, increased number of teachers of color, and increased enrollment and participation of SOCDs in rigorous coursework?

3.1 Research Design and Rationale

This quantitative research is a correlational study which investigates and describes the relationships between the variables based on data for the independent variables from three school years (2020, 2021, and 2022) and their effects on the dependent variable in school year 2022 (Gravetter & Forzano, 2016). The data analysis will focus on examining the differences between participating school districts and non-participating school districts for the identified three school years. Gravetter & Forzano (2016) suggest correlational research is an effective way of investigating the relationships between variables without manipulation or control. This research determines whether relationships exist between the dependent and independent variables, and attempts to "describe the nature of the relationships" (Gravetter, Forzano, 2016, p. 348). This research does not go into details to explain the relationships, and most importantly, does not

intervene in the study by manipulating, controlling, or changing the variables and respective data (Gravetter, Forzano, 2016).

The research design focuses on understanding the relationship between educational equity and the other variables. Accordingly, this study defines educational equity as the dependent variable, and then collects and examines the data based on this definition. The dependent variable is made up of three components as previously discussed: attendance rate, graduation rate, and learning rate. The data collected and examined will help measure the level of educational equity at each school district in the 2021-2022 school year. Because the level of educational equity will be impacted based on the received public funding, level of access to opportunities for SOCDs, and teacher workforce diversity, the effect is delayed and thus the data is focused in school year 2021-2022. Based on the definition of educational equity, this study will calculate an educational equity score for each school district.

Next, the research defines the independent variables based on the constructs already discussed—public funding investment, student access to opportunities, and teacher workforce diversity. School districts that participated in the A&I Program for the most recent three school years will determine the schools that received public funding with the purposes of reducing educational disparities (group one). Three school years (2020, 2021, and 2022) will be examined to allow for meaningful data to emerge. This approach focuses on school districts that received program revenue for at least three years (2020, 2021, and 2022) allowing for schools to implement plans and execute strategic changes, before seeing overall impacts and results. School districts that have recently joined the A&I Program will not be part of this group. Instead, school districts that did not receive continuous A&I Program revenue in the three identified years will be in group two with other non-participating school districts as part of this research. The purpose

of this research approach is to ensure that the school districts received continuous revenue for at least three school years, and received sufficient time to implement and accomplish their A&I Program goals and see results in school year 2021-2022 for improved educational equity.

These participating school districts have a long-term plan and related strategies that might include innovative school enrollment choices, family engagement initiatives, professional development opportunities for teachers and administrators including those who are underrepresented among the licensed teachers or administrators in the district or school, increasing more effective and diverse instructors focused on rigor and college and career readiness for underserved students, and the recruitment and retention of teachers and administrators of color (Achievement and Integration Statute 124.D.861 of 2013). As part of the program requirements, each school district had detailed budget reviewed and approved by the Commissioner of MDE for the identified three school years (Achievement and Integration Statute 124.D.861 of 2013).

Teacher workforce diversity and student access to opportunities constructs will also be defined and operationalized to measure the opportunities for SOCDs in public schools, and the level of diversity of the teacher workforce. Teacher workforce diversity will be defined and measured by the number of teachers of color during the three school years. The student access to opportunities construct will be defined by the enrollment and participation in rigorous coursework for SOCDs for the same three years identified. This construct is measured by the average number of SOCDs who are enrolled in at least one rigorous coursework and the average number of SOCDs who completed at least one rigorous coursework exam in high school for the same three school years. SOCDs are self-identified in one of the following categories: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native

Hawaiian or Pacific Islander, Two or more races, English learner, special education, or free/reduced price meals.

3.2 Target Population and Sample Selection

The level of analysis is at the school district level for the most recent three school years (2020, 2021, and 2022), examining whether relationships exist between the variables. During this time period, there were 328 school districts in Minnesota and 167 school districts participated in the A&I Program, leaving 161 school districts that did not participate in the program (MDE, 2023h). The study focuses on Minnesota's K-12 public operating elementary and secondary independent districts and special school districts, type 01 and 03 respectively. As such, charter schools (type 07), integration districts (type 62), and intermediate school districts (type 06) are not included in this research (MDE, 2023i). To examine the first independent variable (participation in the A&I Program) and its relationship with the dependent variable, there will be one group for school districts that participated in the A&I Program for the identified three school years, and another group for the school districts that did not participate in the A&I Program during that same time frame. Exhibit 1 reflects the 167 school districts that participated in the A&I Program based on actual revenue received for the identified three school years (MDE, 2023h).

3.3 Data Collection Method, Variables, and Operational Definitions

The data collection method is focused on secondary data. In this section, the variables are clearly defined and operationalized based on the constructs previously discussed—educational equity, public funding investment, access to opportunities, and teacher workforce diversity. Table 3 outlines this study's constructs, variables, operational definitions, scales of measurement, and locations of archival data.

Data Collection

The data collection method uses archival, secondary research data—existing data from MDE and MN PELSB. MDE's public website offers robust data by critical measures, broken down by school district and demographic categories. Similarly, MN PELSB provides data made available to the public reflecting the employment, assignment, and licensure information by school district (Minnesota Professional Educator Licensing and Standards Board [MN PELSB], 2023). MN PELSB operates the staff automated reporting (STAR) system which requires school districts to report employment information about race and licensing status (MN PELSB, 2023).

Dependent Variable

The educational equity construct establishes the dependent variable in this study. Omoeva et al. (2018) suggest common education indicators to measure inequality: "Access and participation, completion, learning, attainment, and resources" (p. 54). For this reason, three areas are critical in defining and measuring educational equity: participation, completion, and learning. For participation indicator, Omoeva et al. (2018) recommend the percent of children accessing school. Nielson (2020) argues that diverse classrooms and the interaction with diverse students taking place in an inclusive environment benefit all students. Moreover, students need a safe learning environment to allow for full participation, engagement, and learning (Nielsen, 2020). In this study, the participation indicator is attendance rate. Omoeva et al. (2018) recommend the completion rate as another indicator for educational equity, and in this study's context, it is the graduation rate from the public-school secondary setting. Nielsen (2020) similarly defends educational attainment as a strong indicator of equity: "Graduating from high school on time and with a diploma remains one of the most critical educational objectives for all students" (p. 30). Lastly, for the learning indicator, Omoeva et al (2018) suggest the percent of

students who achieve the minimum proficiency or passing national exams. Nielsen (2020) agrees and states that successful learning requires active engagement. In fact, disengagement often have long-term implications for students of disadvantaged backgrounds (Nielsen, 2020). Nielson (2020) specifically recommends establishing metrics on standardized tests for achievement of reading and math. As such, this study will focus on the math and reading achievement rates for the percentage of students meeting or exceeding standards. In summary, the educational equity measure is made up of three indicators: graduation rate, attendance rate, and learning and engagement level.

Therefore, the educational equity variable is measured by the number of SOCDs who have access to opportunities by attending school, are fully engaged and learning, and have the institutional support and resources to graduate school during the three school years identified. In other words, educational equity is measured by attendance rate, level of learning, and graduation rate. This data will be collected and analyzed for all school districts. This ratio scale variable will be operationalized by focusing on the student demographic categories of: individuals of color (all racial categories with exception of White), disadvantaged backgrounds (special education, free lunch or reduced lunch students, and English language learners), and American Indian backgrounds. Based on these demographics, three components will be assessed, rate calculated, and overall score aggregated for each school district: attendance rate, learning rate, and graduation rate. The data will focus on school year 2021-2022 to factor in the delayed effect of the independent variables.

First, the attendance rate for each school district for this group will be determined for the identified demographic group. The attendance rate is determined by the percentage of students attending more than 90 percent of the days they are enrolled at a school (MDE, 2023f). Students

who attend school in a consistent manner are more likely to do well in school and succeed during and after high school (MDE, 2023f). Next, for the level of learning score, the research will combine the rate of math and reading for this identified demographic group: the percentage of students meeting or exceeding state standards (MDE, 2023e). MDE established the Academic Achievement indicator based on the Minnesota Comprehensive Assessments (MCAs) and Minnesota Test of Academic Skills (MTAS) (MDE, 2023e). These tests allow the state to measure students current level of learning (MDE, 2023e).

Third, this study will determine graduation rate for this demographic group by school district. This study uses the four-year cohort graduation rate. Graduation is often a good indication of employment and having a strong path forward after high school (MDE, 2023d). The four-year cohort rate is determined as a student enters a Minnesota public high school (MDE, 2023d). Based on this date, the student will have four years to graduate high school. MDE determines and adjusts this rate by identifying all students entering grade nine, and backing out the students who moved away and including students who joined the school after the start of grade nine (MDE, 2023d). This number serves as the denominator for the current study. For the numerator, this study uses the number of students of color/disadvantaged background who graduated within this same timeframe and factoring in the same adjustments. With data from these three components, the three percentage scores will be aggregated to calculate the educational equity score for each school district for school year 2021-2022. The aggregate score will be the mean of the three percentage rates of attendance, learning, and graduation for SOCDs.

Independent Variables

Educational equity in this research is focused on the notion that “everyone should have the same opportunity to thrive, regardless of variations in the circumstances into which they are

born" (Cameron et al., 2018, p. 17). To get closer to equality of conditions and outcomes, the state of Minnesota "redistributes" resources and funding to compensate for the existing disparities in the education setting (Cameron et al., 2018). In other words, in order to achieve educational equity, equality of conditions and redistribution are needed. Accordingly in this research, those indicators are: public funding investment, diversity in the teacher workforce, and student access to opportunities. These constructs make up the independent variables in this research. The independent variables will use data from three school years: 2020, 2021, and 2022. These variables have a delayed effect on the dependent variable.

The Participation in the A&I Program. The public funding investment construct establishes the first independent variable—participation in the A&I Program and receipt of program funding. This variable is defined as a school district that received revenue to implement a long-term plan to accomplish the goals of racial and economic integration and improved academic achievement (Achievement and Integration Statute 124.D.861 of 2013). Education finance is a complex and ever-changing system. Historically, education finance reform has been front and center from the state of Minnesota to ensure a more equitable financing system. Odden (2000) argues that school finance is shifting its focus to providing fiscal adequacy and improving equity. Furthermore, the focus on educational adequacy and equity often lead to achieving major progress with cross-district fiscal equity (Odden, 2000). Minnesota's history reveals the substantial shift to provide fiscal support for racial integration and reducing educational disparities. In specific, the Achievement and Integration (A&I) Program was initiated in the 2013-2014 school year to intentionally "pursue racial and economic integration and increase student academic achievement, create equitable educational opportunities, and reduce academic disparities based on student's diverse racial, ethnic, and economic backgrounds" (Achievement

and Integration Statute 124.D.861 of 2013). The goal of the A&I Program is to reduce disparities across school districts, and improve experiences and outcomes for disadvantaged students, including students of color and lower socioeconomic status (Strom, 2021). However, increased program funding does not guarantee improved educational equity in the school setting, across student populations (National Research Council, 1990). The A&I Program is an investment strategy to reduce disparities in the educational setting, and yet, these inputs may have very little influence or linkage with outcomes such as improved educational equity. As a such, this study examines whether increased funding specifically for racial integration and disparities reduction affects educational equity.

The participation in the A&I Program variable will define two groups: A&I Program school district participants and non-participants based on three identified school years. Using a nominal/categorical scale, this variable will be operationalized by identifying school districts that participated in the A&I program and school districts that did not participate in the A&I program in the identified three school years. This archival data will be collected from MDE's public website. Data from school districts that participated in the A&I Program, will be compared to the data of non-participating school districts, looking at the differences between the mean scores.

The Enrollment and Participation in Rigorous Coursework for Students of Color and Disadvantaged Backgrounds. The access to opportunities for SOCDs construct establishes the third independent variable—the enrollment and participation in rigorous coursework for SOCDs. Another important factor is the access to opportunities, in specific, the enrollment and participation of SOCDs in of rigorous coursework. Do students of color and/or American Indian background have opportunities to enroll and fully participate in rigorous coursework? Nielsen (2020) argues that "equalizing access to high-quality advanced coursework represents a potential

lever for reducing disparities in educational attainment" (p. 14). For this reason, this variable has two elements that will be examined individually and collectively—enrollment in rigorous coursework and completion of rigorous course exam.

Enrollment in rigorous coursework for the data analysis is defined as the enrollment in one of following courses: concurrent enrollment or Postsecondary Enrollment Options (PSEO) (MDE, 2022g). These courses provide the student with the opportunity to earn college credit while in high school or prepare them for academic success in postsecondary institutions (MDE, 2022g). In particular, college preparatory courses have been the vehicle for effectively preparing students for college (Huerta et al., 2013). For students of color and/or underserved students, college preparatory courses are even more important for academic success (Huerta et al., 2013). The term "participation" is defined by the completion of at least one rigorous course exam in high school. Based on The College Board, taking AP exams is a good measurement of AP participation (Phillips & Lane, 2021). First-year college G.P.A. and four-year college completion rates for students who completed one to two AP exams were much higher than students who took no exams (Phillips & Lane, 2021; Beard et al., 2019). In Minnesota, AP exams are open to all students. Students may qualify for college credits if they complete AP coursework and/or take the AP course examination (MDE, 2023c). For the International Baccalaureate (IB), exams are only open to IB Program students. Additionally, only students who score 4 or higher will receive college credits at colleges and universities worldwide (MDE, 2022d). For both exams, the state will fully reimburse exams for fee-reduced, low-income students and partially reimburse exams for non-fee-reduced students (MDE, 2022d; MDE, 2023c).

This variable is measured by the mean score for the identified three school years. The mean score is made up of two components: enrollment rate, and exam completion rate. The

enrollment percentage is calculated by the total number of SOCDs enrolled in rigorous coursework over the total number of students in the program by school district. The exam completion percentage is calculated by the total number of SOCDs who took at least one exam in high school over the total number of students who took at least one exam in high school for the same three school years. SOCDs in this group are self-identified in one of the following categories: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, two or more races, English learner, special education, or free/reduced price meals. Therefore, this variable uses a continuous scale and it is operationalized by determining the rate of enrollment/participation for this demographic group for both A&I participating and non-participating school districts during the 2020, 2021, and 2022 school years.

Teachers of Color. The teacher workforce diversity construct establishes the second variable—teachers of color. There is compelling argument that teachers have a significant role in the classroom, directly affecting student performance and outcome (Nielsen, 2020). In particular, the teacher's experience and racial/ethnic background have important effects on the student's learning experience and outcomes (Nielsen, 2020). A teacher of color is defined as an individual of color, belonging to a racial or ethnic group or American Indian background, licensed to teach in Minnesota (MDE, 2022f). What happens in the classroom may also significantly affect educational equity, both independently and interactively with program funding. Minnesota's K-12 public schools are made up of 34 percent students of color or American Indian background and only four 4 percent of teachers identify as teachers of color or having American Indian background (MDE, 2022c). Research indicate that teachers of color (racially and ethnically diverse backgrounds) are important to students of color and American Indian students; and in

fact, having teachers of color benefits all students (The Coalition to Increase Teachers of Color and American Indian Teachers in Minnesota, 2022; MDE, 2022c). In particular, Cobb (2017) argues that white teachers are more likely to uphold a color-blind ideology in the classroom setting, which is counterproductive to dismantling institutional racism and other discriminatory practices. Furthermore, Matsumura et al. (2008) state: "The quality of the classroom climate and teacher-student relationships may be especially critical during students' transition to and through middle school" (p. 294). Consequently, increasing the number of teachers of color may positively affect educational equity.

This variable will be measured and operationalized by the number count of teachers of color divided by the overall number count of teachers for each Minnesota school district. MN PELSB collects and retains this data and it can be reported by district level for those three school years. Thus, this measure uses a continuous scale by collecting the total number of licensed teachers of color in the school district as the numerator and the total number of licensed teachers in the school district as the denominator. This data is aggregated and available by school district for the three identified school years

Control Variables

For this study, the following variables are held constant: dollar amount of funding received for A&I Program, size of the school district based on enrollment number, maximum allowable certified levy amount, and student demographics within each school district. These control variables are not of interest in the current study and thus these variables are held constant in order to effectively test the relationships between the dependent and independent variables.

There are significant variances in terms of the actual revenue dollar amount each school district received for the A&I Program, and these variances are not examined in this study. This

study calculates the average revenue received for the A&I Program for participating school districts across the identified three school years. The school district size is based on the average enrollment numbers on an annual basis for three school years identified as part of this study Additionally, each school district board may levy a property tax amount, but the rate is limited by Minnesota statute (Strom, 2021). For the A&I Program, 30 percent of the revenue is funded through local levy and other resources (Strom, 2021). For this reason, there are variations from school district to school district for the local levy amount, and this study does not focus on this variation. This study calculates the average annual maximum tax levy amount for each school district for the three school years. Along the same lines, this study holds constant the size of the school district to make sure the size of the school district does not impact this study's outcomes. And finally, the socioeconomic and racial demographics of students are held constant in this study as well. The average annual rate of students of color is calculated and makes up one control variable. The average annual rate of students of disadvantaged background is calculated and makes up another control variable as part of this study. The focus in this research is on the analysis of the data within each school district for educational equity, and not on the comparative data analysis across school districts.

Table 3

Constructs, Variables, and Operational Definitions

Construct	Variable (Independent, IV or Dependent, DV)	Operational Definition	Archival Data (School District Level)
Educational Equity	(DV) The number of students who have access to opportunities by attending school, are fully engaged and learning, and have the institutional support and resources to graduate based on data from the 2022 school year	The mean score of rates for SOCDs for the following three items in school year 2021-2022, by school district: 1. The attendance rate: percentage of students attending more than 90 percent of the days they are enrolled at a school 2. The learning rate: percentage of students meeting or exceeding state standards 3. The graduation rate: percentage of students who graduate from a school, using 4-year adjusted cohort	MDE, data on: 1. Attendance rate by student demographic and school district 2. Learning achievement rate by student demographic and school district 3. Graduation rate by student demographic and school district
Public funding investment	(IV) A&I Program participating and non-participating school districts across three school years: 2020, 2021, and 2022	Group one: School districts that received revenue to implement the A&I Program for three continuous school years (2019-2022). Group two: School districts that did not receive continuous revenue for the A&I Program for the same three years	MDE, list of school districts that received revenue for the A&I Program. (see Exhibit 1)
Teacher workforce diversity	(IV) The number of teachers of color across three school years: 2020, 2021, and 2022	The total number of teachers of color divided by the total number of teachers in school years 2019-2022 for each school district.	MN PELSB, race / ethnicity demographics of teachers by district level
Access to educational opportunities for SOCDs	(IV) Enrollment: The number of SOCDs enrolled in rigorous coursework in high school for the identified three school years. (IV) Exam/Participation: The number of SOCDs who completed at least one rigorous course exam in high school for the identified three school years.	The mean score for SOCDs in 2020, 2021, and 2022: 1. Enrollment percentage: The number SOCDs enrolled in rigorous coursework over total number of students in the program. 2. Exam completion percentage: The number of SOCDs who took at least one exam over the total number of students who took at least one exam.	MDE, rigorous course enrollment and exams completed statewide and by district and student demographic.

Note. Source: MDE, 2023h

3.4 Validity and Reliability of Measurement

To ensure validity of the independent measures, this study operationalizes the measures by using existing metrics operationalized and managed by MDE and MN PELSB (Gravetter & Forzano, 2016). For the first independent variable, participation in the A&I Program, this research uses the same definition and criteria as determined by MDE. For the three school years identified in this study, MDE reports on the school district's approved budgets, actual expenditures, and revenue received for the A&I Program. For the second and third independent variables, this research has a similar approach by using the same measures as defined and operationalized by MN PELSB and MDE in counting the number of teachers of color and number of students of color/disadvantaged backgrounds who enrolled and participated in rigorous coursework respectively. MDE and MN PESLB collect the data on an annual basis, and therefore this study uses their measurement procedures to ensure validity and consistency. This study does not conduct separate or additional measurement procedures for the independent variables. For this reason, there is construct validity for all three independent variables.

On the other hand, for the dependent variable, there is predictive validity. The dependent variable (educational equity) is made up of three components for SOCDs: attendance rate, learning rate, and graduation rate. These three measures are existing measures that MDE operationalizes by establishing the measures, collecting data, and summarizing by school district on an annual basis. These three measures accurately predict behavior that demonstrate equality of educational opportunity—fairness in access to opportunities or to ensure a fair starting point for students of color or disadvantaged backgrounds (BenDavid-Hadar, 2018). The attendance rate is the count of attendance for students in each school district. This data is collected and managed by MDE.

Additionally, MDE measures level of learning by conducting standard tests—Minnesota Comprehensive Assessments (MCAs) and Minnesota Test of Academic Skills (MTAS) (MDE, 2023e). A student's score on these assessments is placed on a four-level grading scale: does not meet standards, partially meets standards, meets standards, and exceed standards (MDE, 2023e). Students in the last two levels will be included in the data indicating that they are engaged and learning at their grade level. Lastly, the graduation rate is the count of students who graduate from high school. MDE collects this data by race/ethnic categories and by school district on an annual basis. The combination of results (across the three measures) provides strong support or better understanding of equality of educational opportunity. Thus, the educational equity measure is based on these three components, demonstrating predictive validity.

MDE and MN PELSB applied the measurement procedures across all school districts in the same manner (Gravetter & Forzano, 2016). Thus, the measurement procedures will consistently produce results across Minnesota school districts for all three school years. The measurement procedures do not change from school district to school district, or from year to year. All variables rely on counting the number of school districts, teachers, and students operationalized and managed by MDE or MN PELSB, or a survey operationalized and managed by MDE. Therefore, there is consistency of the measurement procedures, indicating reliability in this research methodology.

3.5 Data Analysis

To analyze the data, this research will use both descriptive and inferential statistics. As part of the descriptive statistics, the research will have a correlational strategy, measuring and describing the relationship between two or more variables (Gravetter & Forzano, 2016). A correlation coefficient value is between -1 and +1, with a negative value indicating a negative

relationship between the two variables, and a positive value indicating a positive relationship (Field, 2018). As such, a zero value indicates no relationship (Field, 2018). The correlation analysis will show the relationships between the dependent and independent variables (Field, 2018).

First, this data will show the strength of the association between the participation in A&I Program variable and the educational equity variable. For the participation in A&I Program variable, there will be one group for school districts that participated in the A&I Program during the three school years, and another group for the school districts that did not participate in the A&I Program during the same time period. The first analysis will focus on examining the relationship between participation in A&I Program and educational equity by comparing means. In other words, data for A&I participating school districts will be compared to the data for non-participating school districts.

Second, this data analysis will focus on the strength of association (correlation) between student enrollment/participation in rigorous coursework and educational equity. For this data set, the analysis will examine the differences between the two groups of school districts—A&I participating and non-participating school districts. Third, the data analysis will determine the moderating effect of student enrollment/participation in rigorous coursework on the participation in A&I Program and educational equity. Fourth, the data analysis will assess the relationship between teachers of color and educational equity. Lastly, the data analysis will determine the moderating effect of teachers of color on the participation in A&I Program and educational equity.

Inferential statistics will be used to help make generalizations about school districts and educational equity (Gravetter & Forzano, 2016). For testing the relationship between the nominal

variable (participation in A&I Program) and educational equity, a t-test will be used for the data analysis. The research examines the difference between the two groups (A&I participating and non-participating school districts) by comparing two means (Field, 2018). For the continuous variables, the inferential statistics will focus on the analysis of the regression to determine the significance of the regression line (Gravetter & Forzano, 2016). A scatter plot including a regression line will be conducted to help describe the relationship between variables. An interaction effect in a multiple regression analysis will be conducted to test the relationship between the dependent variable and the independent variable and moderating variable, while controlling the influence of other variables (Gravetter & Forzano, 2016). The multiple regression analysis will focus on the standardized coefficients beta value to help determine the strength of the interaction effect between the dependent, moderating, and independent variables (Field, 2018). For example, a Pearson Correlation coefficient value of +/-0.1 is a small effect, +/-0.3 is a medium effect, and +/-0.5 is a large effect (Field, 2018). The standardized regression coefficients and unstandardized regression coefficients values will also help measure the change in the dependent variable in terms of standard deviations or as the independent variable changes (Goyal, 2023). The standardized regression coefficients value can be compared across the independent variables, whereas the unstandardized regression coefficient provides importance for determining the effect size and direction of the independent variable on the dependent variable (Goyal, 2023).

Additionally, the researcher will look at the statistical significance value (p-value) of each standardized coefficients beta to ensure that the results did not happen by random chance (Field, 2018). In this study, the researcher expects to find statistical significance values of less than 0.05, and ideally less than 0.01 (Field, 2018). The unstandardized coefficients beta will

indicate a strong effect, weak effect, or no effect; and the p-value will indicate the statistical significance of the results (Field, 2018). The bigger the unstandardized coefficients beta, the more important and meaningful the independent variable will be for the research (Field, 2018). However, the statistical significance value must also indicate that the observed data did not happen randomly or by chance. The results of the multiple regressions will either support or not support the hypotheses.

3.6 Methodology Limitations and Researcher Bias

As with any research, there are limitations with this study's methodology. Additionally, the researcher's bias exists which may result in this research highlighting certain experiences that are similar, familiar, and personal. However, the researcher's bias will be limited and controlled by: focusing on the data without intervention and manipulation, incorporating Critical Race Theory as the foundation of this study's hypotheses along with current literature and empirical studies, and incorporating a self-reflection as part of this research in an intentional and deliberate manner. The goal is to be forthright about the researcher's background, educational experience, and racial/social identities for the purposes of disclosing any potential and perceived bias in both the process and outcome of this research.

Methodology Limitations

First, the research is based on the assumption that all data are available and aggregated by school district for the school years from 2019 to 2022. There is a possibility that the data is not complete, because this research includes the most recently concluded school year (2021-2022). There may be delay in collecting and reporting data, and the possibility of distorted data due to the timeframe. In addition, the COVID-19 pandemic may have a significant impact on the data due to the school districts' response to the changes in operations, school services, or data

collection. The pandemic may also have direct and indirect effects on attendance and graduation rates.

Second, another limitation of the research is that the study focuses on determining whether there are relationships between the variables; and the study is not focused on the analysis of the content of each school district's A&I Program plan. For example, this research does not examine whether a school district met its own racial integration program objectives in the three school years identified as part of this study. Moreover, this research is not a longitudinal study. The research is limited to comparing the data between A&I participating and non-participating school districts based on three years of data. Although the data reviewed as part of this research spans three school years, from 2019 to 2022, the study does not examine school districts over time or educational equity over time. A longitudinal research design involves measuring the variable and in the same group over a period of time (Gravetter & Forzano, 2016). For this reason, examining longitudinal data may indicate different results and implications for educational equity.

Furthermore, the study does not examine educational equity from the perspective of horizontal equity (same treatment of students who are similar or alike) or vertical equity (for purposes of fairness, some students need more than others); but rather, the study focuses specifically on equality of educational opportunity—fairness in access to opportunities or to ensure a fair starting point for students of color or disadvantaged backgrounds (BenDavid-Hadar, 2018). Thus, the educational equity measure will be limited to three factors that will help determine the school district's level of educational equity: attendance rate, learning rate, and graduation rate for SOCDs.

Lastly, this is a quantitative study and there are limitations with this approach. In quantitative studies, a regression analysis is the method used to determine whether a relationship exists between variables. The regression analysis does not examine in depth or describe in detail why and how the relationship exists. Additionally, this study uses secondary data which is also limiting. In specific, the categories of race and ethnicity do not provide the level of detail that may be meaningful, and this level of detail deserves its own research. For example, Asian Americans are lumped together as a single homogenous group (Garcia & Mayorga, 2017). The specific limitation is that the result of treating Asian Americans as a single group does not portray all Asian Americans accurately. In fact, the data and results can be misconstrued and misleading. Garcia and Mayorga (2017) suggest that Asian Americans are stereotyped as the model minority and certain Asian American groups do not benefit from this stereotype. In future research, there may be an opportunity to disaggregate the data for the Asian American group. Analyzing the data in this way will be meaningful as the different groups have different experiences and varying educational performances (Garcia and Mayorga, 2017). Critical Race Theory scholars are critical of the quantitative methodology for it often reflects a "superficial understanding of racism and perpetuate white supremacy" (Garcia and Mayorga, 2017, p. 236). This study attempts to determine whether relationships exist between variables, with clear acknowledgment that further exploration and examination of those variables will be needed in subsequent research. In other words, this study is the starting place, and perhaps serves as a road map, for the work that lies ahead to better understand educational equity and how Minnesota addresses educational disparities for SOCDs.

Researcher Bias: Self-Reflection

I grew up in a small, rural town in southern California. My memory of K-12 education is filled with both achievement and adversity. The most accurate summary of my secondary educational experience is of hard work, perseverance, and adversity braided together. I am a first generation, Hmong American woman who grew up in a lower socioeconomic, Hmong-speaking household, and I enjoyed all the challenges in the educational setting. Nonetheless, I certainly did not receive educational opportunities in the same way as my White classmates.

In retrospect, the reality was that I did not have a strong support system in place to succeed and achieve my full potential in the academic setting, compared to my White classmates. I did not have English speaking parents to help me through English Honors, or parents to help advocate for placement in rigorous coursework. Additionally, I was the only Hmong American student in AP courses, in a town that had a very large Hmong American population. Furthermore, all my teachers were White, and my classmates were White except for one or two other students of color. For this reason, I have a very specific perspective of the education system directly based on my own experience. Although I grew up in California, my two daughters are currently in secondary schooling in Minnesota. I directly observe similar environments, behaviors, and institutional inequities with my seventh-grade and second-grade daughters.

The role of the researcher is to accurately capture the data trends and statistical relationships between the variables to reflect the general experiences of SOCDs in the Minnesota education setting, which may be very different or similar to my own experience. Consequently, I will follow the rigor of the quantitative methodology to: collect secondary data, analyze the data for trends and patterns, and allow relationships to emerge based on descriptive and inferential statistics.

CHAPTER 4

4. DATA AND FINDINGS

In this chapter, both descriptive data and inferential statistics are provided to highlight the findings and analysis. Additionally, the analysis will focus on whether the data support or do not support the hypotheses. As part of the descriptive statistics, the research will have summary data and Pearson correlation analyses—measuring and describing the correlation between two or more variables (Gravetter & Forzano, 2016). In specific, the correlation analysis will show the associations between the dependent and independent variables (Field, 2018). For this study, inferential statistics will be used to help make generalizations about school districts and educational equity (Gravetter & Forzano, 2016). Both linear and multiple regressions will test the relationship between the dependent variable, independent variable, and moderating variable for the interaction effects, while controlling the influence of other variables (Gravetter & Forzano, 2016). The multiple regression interaction effect analysis will focus on the standardized coefficients beta value to help determine the strength of the effect between all variables (Field, 2018). For example, a correlation coefficient value of +/-0.1 is a small effect, +/-0.3 is a medium effect, and +/-0.5 is a large effect (Field, 2018). The standardized regression coefficients and unstandardized regression coefficients values will also help measure the change in the dependent variable in terms of standard deviations or as the independent variable changes (Goyal, 2023). The standardized regression coefficients value can be compared across the independent variables, whereas the unstandardized regression coefficient provides importance for determining the effect size and direction of the independent variable on the dependent variable (Goyal, 2023). Additionally, the researcher will look at the statistical significance value (p-value) of each standardized coefficients beta to ensure that the results did not happen by random chance (Field, 2018).

First, this data will show the strength of the association between the A&I Program participation variable (public funding investment) and the educational equity variable. For the participation in A&I Program variable, there will be one group for school districts that participated in the A&I Program during the 2020, 2021, and 2022 school years, and another group for the school districts that did not participate in the A&I Program during the same time period. The first analysis will focus on examining and comparing the means of the data of the two groups by conducting an independent t-test. Second, this data analysis will focus on the strength of association between student enrollment and participation in rigorous coursework (student access to opportunities) and educational equity. Third, the data analysis will determine the interaction effect of student enrollment/participation in rigorous coursework and the participation in A&I Program on educational equity. Fourth, the data analysis will assess the relationship between teachers of color (teacher workforce diversity) and educational equity. Lastly, the data analysis will determine the interaction effect of teachers of color and the participation in A&I Program on educational equity.

Table 4 below provides the descriptive statistics for all variables in this study. This information will help provide an orientation of the variables, including the control variables, before proceeding to the data analysis. The skewness measures the symmetry and kurtosis determines if the data is normally distributed (National Institute of Standards and Technology [NIST], 2023). For skewness, the normal distribution is zero, so having a value close to zero indicates symmetry (NIST, 2023). Negative skewness means that the data is skewed left, and positive skewness indicates that the data is skewed right having too many low scores (NIST, 2023; Field, 2018). For the kurtosis value, a normal distribution is (+/-) three (NIST, 2023). A positive kurtosis indicates a heavy-tailed distribution, and almost all kurtosis values are positive

in this study. In specific, the educational equity is fairly normally distributed. The binary variable, A&I Program participation variable, was not included in this table and analysis. For this study, there are 167 A&I Program participating school districts and 161 non-participating school districts. However, three independent variables do not reflect normal distributions—rigorous coursework enrollment, rigorous coursework exam completion, and teachers of color. All three variables were log transformed to address the highly skewed and/or non-normal distribution of data. Additionally, all control variables with the exception of student demographics for students of disadvantaged backgrounds were similarly normalized.

Table 4

Descriptive Statistics of All Variables

Variable		Statistic	Std. Error
DV: Educational Equity	N	289	
	Range	65.130	
	Minimum	11.490	
	Maximum	76.620	
	Sum	16,654.820	
	Mean	57.629	.491
	Std. Deviation	8.343	
	Median	58.340	
	Skewness	-.836	.143
	Kurtosis	2.693	.286
IV: Rigorous Coursework Enrollment Rate	N	288	
	Range	100.00	
	Minimum	.00	
	Maximum	100.00	
	Sum	4,812.50	
	Mean	16.710	.859
	Std. Deviation	14.578	
	Median	12.885	
	Skewness	2.208	.144
	Kurtosis	6.516	.286
IV: Rigorous Coursework Exam Completion Rate	N	326	
	Range	70.16	
	Minimum	.00	
	Maximum	70.16	
	Sum	2,262.76	

Variable		Statistic	Std. Error
	Mean	6.941	.585
	Std. Deviation	10.569	
	Median	.000	
	Skewness	2.145	.135
	Kurtosis	6.165	.269
IV: Teachers of Color	N	327	
	Range	21.500	
	Minimum	.000	
	Maximum	21.500	
	Sum	747.460	
	Mean	2.286	.175
	Std. Deviation	3.162	
	Median	1.260	
	Skewness	2.336	.135
	Kurtosis	7.000	.269
Control 1: A&I Program Revenue (Amount Received)	N	328	
	Range	15,468,352.93	
	Minimum	0	
	Maximum	15,468,352.93	
	Sum	106,597,705.63	
	Mean	324,993.0050	70,952.033
	Std. Deviation	1,284,995.9863	
	Median	8711.765	
	Skewness	8.478	.135
	Kurtosis	85.730	.268
Control 2: School District Enrollment Size	N	328	
	Range	38,296.00	
	Minimum	39.00	
	Maximum	38,335.00	
	Sum	808,008.00	
	Mean	2,463.4390	253.960
	Std. Deviation	4,599.412	
	Median	936.000	
	Skewness	4.725	.135
	Kurtosis	27.664	.268
Control 3: Maximum Tax Levy Amount	N	328	
	Range	230,251,181.00	
	Minimum	7,076.00	
	Maximum	230,258,257.00	
	Sum	3,392,886,656.0	
	Mean	10,344,166.634	1,318,166.265
	Std. Deviation	23,873,006.409	
	Median	2,809,241.500	
	Skewness	5.267	.135
	Kurtosis	36.055	.268

Variable		Statistic	Std. Error
Control 4: Student Demographic, Race / Ethnicity	N	328	
	Range	98.06	
	Minimum	1.94	
	Maximum	100.00	
	Sum	7,027.27	
	Mean	21.4246	1.071
	Std. Deviation	19.40520	
	Median	14.265	
	Skewness	1.869	.135
	Kurtosis	3.437	.268
Control 5: Student Demographic, Disadvantaged Background	N	328	
	Range	38.39	
	Minimum	6.09	
	Maximum	44.48	
	Sum	5897.05	
	Mean	17.9788	.355
	Std. Deviation	6.43642	
	Median	16.935	
	Skewness	.886	.135
	Kurtosis	.967	.268

Note. A&I Program participation variable is a binary variable and is not reported as part of this descriptive statistics table.

4.1 Public Funding Investment and Educational Equity

For the three school years identified for this study, MDE had data available at the school districts level for three data components for the three school years 2020, 2021, and 2022: 289 school districts reported on graduation rates, 320 school districts reported on learning rates, and 325 school districts reported on attendance rates. School districts that did not have all three rates were excluded from the data analysis for the educational equity score. There were 39 school districts that did not have data available for all three components at the time the data was pulled. Of the 39 school districts that did not have data for all three data components, 30 schools were non-participating school districts and nine were A&I Program participating school districts. The educational scores are used in the correlation analysis, linear regression, and multiple regression. However, when examining the components individually, all reported scores were included in the descriptive statistics. As such, this first data analysis will highlight the three components of educational equity: graduation, learning, and attendance rates. Additionally, this analysis summarizes the educational equity scores for all Minnesota school districts. And finally, to generalize for the population, this analysis compares the means between the two groups—A&I participating school districts and non-participating school districts—by conducting an independent t-test.

The educational equity measure is made up of three components: graduation, learning, and attendance rates. For this study, the educational equity score is established by calculating the average across the three scores—graduation, learning, and attendance rates. Focusing on SOCDs, the attendance rate is determined by the percentage of students attending more than 90 percent of the days they are enrolled at a school (MDE, 2023f). Next, for the level of learning score, the research will combine the rate of math and reading for this identified demographic group: the

percentage of students meeting or exceeding state standards (MDE, 2023e). MDE measures level of learning by conducting standard tests—Minnesota Comprehensive Assessments (MCAs) and Minnesota Test of Academic Skills (MTAS) (MDE, 2023e). A student's score on these assessments is placed on a four-level grading scale: does not meet standards, partially meets standards, meets standards, and exceed standards (MDE, 2023e). Students in the last two levels will be included in the data indicating that they are engaged and learning at their grade level. Lastly, the four-year cohort graduation rate will be used for the graduation rate. The four-year cohort rate is determined as a student enters a Minnesota public high school (MDE, 2023d). Based on this date, the student will have four years to graduate high school. MDE determines and adjusts this rate by identifying all students entering grade nine, and backing out the students who moved away and including students who joined the school after the start of grade nine (MDE, 2023d). This number serves as the denominator for the current study. For the numerator, this study uses the average of number of students of color and the average of the number of students of disadvantaged backgrounds who graduated within this same timeframe and factoring in the same adjustments.

To examine the specific components of the educational equity measure, the data indicates that the learning rate is the lowest score across the 320 reported school districts, with graduation rate as the highest score collectively across the 289 reported school districts, followed by the attendance rate reported by 325 school districts. Table 5 reflects the summary data for all three rates individually. All three rates reflect normal distributions based on the skewness and kurtosis values.

Table 5

Educational Equity Summary Data: Graduation, Learning, and Attendance Rates

Educational Equity		Statistic	Std. Error
Graduation Rate (Multivariate)	N	289	
	Range	84.76	
	Minimum	15.24	
	Maximum	100.00	
	Sum	22,798.75	
	Mean	78.889	.767
	Std. Deviation	13.044	
	Median	80.770	
	Skewness	-.973	.143
	Kurtosis	1.954	.286
Learning Rate (Multivariate)	N	320	
	Range	53.34	
	Minimum	5.24	
	Maximum	58.58	
	Sum	9781.22	
	Mean	30.566	.496
	Std. Deviation	8.867	
	Median	29.83	
	Skewness	.356	.136
	Kurtosis	.426	.272
Attendance Rate (Multivariate)	N	325	
	Range	79.82	
	Minimum	13.99	
	Maximum	93.81	
	Sum	20784.11	
	Mean	63.951	63.951
	Std. Deviation	12.320	
	Median	64.320	
	Skewness	-.354	.135
	Kurtosis	1.041	.270
Educational Equity (DV)	N	289	
	Range	65.130	
	Minimum	11.490	
	Maximum	76.620	
	Sum	16,654.820	
	Mean	57.629	.491
	Std. Deviation	8.343	
	Median	58.340	
	Skewness	-.836	.143
	Kurtosis	2.693	.286

Note. Data is the average rate for SOCDs in school years 2020, 2021, and 2022

Educational equity is the combined rate of all three: graduation, learning, and attendance. Across 289 school districts, the educational equity scores reflect a normal distribution with the mean score at 56.629, the minimum at 11.49, and the maximum at 76.62. Table 5 also provides the descriptive statistics of the dependent variable—educational equity. The first analysis is focused on comparing the data between school districts that participate in the A&I Program and the school districts that are not participants of the A&I Program. This data analysis helps determine whether public funding investments affect educational equity. The result of the finding indicate that the means are almost the same with a small difference of 1.223. The maximum amounts are also similar but with a slightly larger difference of 1.660. However, the minimum amounts yield the largest difference of 25.310.

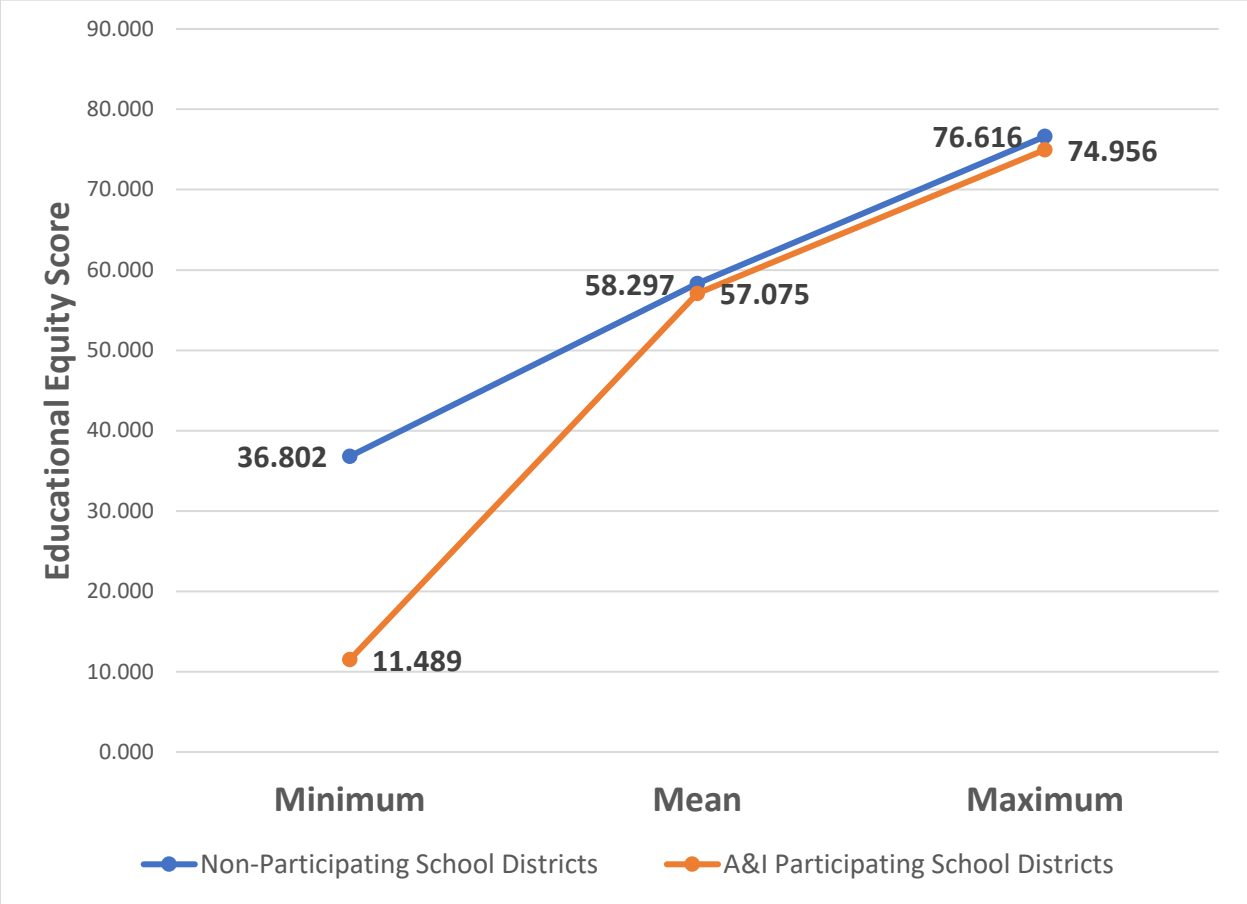
In Figure 3, the data showcases that for A&I Program participating school districts, the educational equity score was slightly lower compared to school districts that did not participate in the A&I Program for the same three school years. At surface level, the differences are not substantial. Thus, an independent t-test was conducted to determine if the differences between the means are statistically significant. The independent t-test allows for a comparison of scores that are independent—different school districts or entities that are being tested for difference conditions (Field, 2018). As indicated in Table 6, the t-value for educational equity is 1.241. The t-value is the mean difference divided by the standard error (1.223/.984 = 1.241). The degrees of freedom value is noted at 287. In comparing the t-value to a critical value based on the degrees of freedom, the t-value is smaller than 1.650 which is the critical value calculated at the .05 significance level (Field, 2018). The result is that there is no significant difference between the two means of the two groups because 1.241 is less than 1.650. Furthermore, the two-sided p-value should be less than .05, and in this case, the significance value is .216. Additionally, the

95% confidence interval of the difference crosses zero also indicating no significant difference. The findings confirm the first hypothesis of this study: public funding investment (A&I Program funding) has no effect on educational equity for Minnesota K-12 public school districts.

The outcome of the data analysis underscores the importance of dismantling institutional racism in a holistic and effective manner, requiring more than minimal public investments. CRT argues that the world we live in today, in which school funding, segregation, teachers, curriculum, and the overall infrastructure of education is based on systemic and institutional racism (Ladson-Billings, 2016a). The A&I Program has great intentions of beginning the work of reducing educational disparities; however, more effective supports, targeted strategies, and accelerated efforts need to take place to achieve educational equity. The incremental approach to racial integration and equity have resulted in limited impact. As suggested by Litowitz (2016), it is possible that efforts of affirmative action or segregation may fail to advance the interest of individuals of color. However, the question that surfaces is if there are opportunities that can be focused on as part of the A&I Program to begin the work of substantial change toward true educational equity. Thus, the study focuses on identifying opportunities for accelerating educational equity in two ways—student access to opportunities and teacher workforce diversity. First, the study explores and determines control variables, so to hold constant factors that can influence the outcomes.

Figure 3

Educational Equity Scores: Comparing Minimums, Means, and Maximums Rates



Note. The mean difference is 1.223.

Table 6

Independent T-Test: Educational Equity for Participating and Non-Participating A&I Program School Districts

Levene's Test for Equality of Variances		**df**	**Significance (2-sided)**	**Mean difference**	**Standard Error Difference**	**95% Confidence Interval of the difference**	
t	**Sig.**					**Lower**	**Upper**
1.241	.540	287	.216	1.223	.984	-.716	3.161

Note. The t-test was conducted to determine the significant difference between the means of A&I participating and non-participating school districts. In this case, because the Levene's Test

significance value was at .540 (greater than .05), data was interpreted using equal variances assumed.

4.2 Control Variables and Educational Equity

In this study, there are five control variables based on school district: average annual revenue dollar amount received for the A&I program (C1), average annual school district enrollment size (C2), average annual maximum allowable certified levy (C3), average percentage of students of color (C4), and average percentage of students of disadvantaged background (C5). To better understand the correlation between educational equity and the control variables, a simple correlational analysis was conducted, as outlined in Table 7. With the control variable of A&I Program revenue amount received, there is a negative correlation with educational equity of -.190 and this value is statistically significant. Additionally, two other control variables indicate negative relationships: the demographic rates of students of color and students of disadvantaged backgrounds, both with p-values of less than 0.001, indicating statistical significance. This data means that there is a negative correlation between student demographics (race/ethnicity and disadvantaged backgrounds) and educational equity.

There is a negative correlation between control variable 2, school district enrollment size, and educational equity but it does not indicate a statistically significant result. The only positive correlation with educational equity is the maximum allowable levy amount variable, however, the p-value exceed .05, indicating that it is not statistically significant. Table 7 also reflects the correlations between the dependent variable and independent variables without factoring in any control variables, and the correlations between the independent variables and control variables. The results indicate that all independent variables have negative correlations with the dependent

variable, all at statistically significant levels; however, positive correlations are noted between the independent variables and the control variables, most of which are statistically significant.

The result of the correlational analysis across all variables indicates that there are statistically significant relationships between control variables and both dependent and independent variables, indicating their potential to impact the results of the study. Therefore, these variables will be held constant in the data analysis because of the potential of influencing the outcome. Accordingly, in the subsequent data analyses, the identified control variables will be held constant to ensure that these variables do not influence the outcome.

Table 7

Correlational Analysis of Control Variables, Independent Variables, and Dependent Variables

Variable		Educational Equity (DV)	Rigorous Coursework Enrollment (IV)	Rigorous Coursework Exam Completion Rate (IV)	Teachers of Color (IV)	Control 1: A&I Program Revenue	Control 2: School District Enrollment Size	Control 3: Maximum Levy Amount	Control 4: Student Demographic, Race / Ethnicity	Control 5: Student Demographic, Disadvantaged Background
Educational Equity (DV)	Pearson Correlation	1	-.394**	-.246**	-.242**	-.190*	-.069	.009	-.472**	-.521**
	Significance (2-tailed)		<.001	.003	<.001	.016	.245	.878	<.001	<.001
Rigorous Coursework Enrollment (IV)	Pearson Correlation	-.394**	1	.621**	.528**	.516**	.225**	.206**	.706**	.654**
	Significance (2-tailed)	<.001		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Rigorous Coursework Exam Completion Rate (IV)	Pearson Correlation	-.246**	.621**	1	.511**	.556**	.251**	.284**	.623**	.572**
	Significance (2-tailed)	.003	<.001		<.001	<.001	.002	<.001	<.001	<.001
Teachers of Color (IV)	Pearson Correlation	-.242**	.528**	.511**	1	.290**	.082	.057	.487**	.397**
	Significance (2-tailed)	<.001	<.001	<.001		<.001	.221	.398	<.001	<.001
Control 1: A&I Program Revenue	Pearson Correlation	-.190*	.516**	.556**	.290**	1	.927**	.904**	.496**	.087
	Significance (2-tailed)	.016	<.001	<.001	<.001		<.001	<.001	<.001	.259
Control 2: School District Enrollment Size	Pearson Correlation	-.069	.225**	.251**	.082	.927**	1	.943**	.383**	-.100
	Significance (2-tailed)	.245	<.001	.002	.221	<.001		<.001	<.001	.069
Control 3: Maximum Levy Amount	Pearson Correlation	.009	.206**	.284**	.057	.904**	.943**	1	.320**	-.161**

Variable		Educational Equity (DV)	Rigorous Coursework Enrollment (IV)	Rigorous Coursework Exam Completion Rate (IV)	Teachers of Color (IV)	Control 1: A&I Program Revenue	Control 2: School District Enrollment Size	Control 3: Maximum Levy Amount	Control 4: Student Demographic, Race / Ethnicity	Control 5: Student Demographic, Disadvantaged Background
	Significance (2-tailed)	.878	<.001	<.001	.398	<.001	<.001		<.001	.003
Control 4: Student Demographic, Race / Ethnicity	Pearson Correlation	-.472**	.706**	.623**	.487**	.496**	.383**	.320**	1	.636**
	Significance (2-tailed)	<.001	<.001	<.001	<.001	<.001	<.001	<.001		<.001
Control 5: Student Demographic, Disadvantaged Background	Pearson Correlation	-.521**	.654**	.572**	.397**	.087	-.100	-.161**	.636**	1
	Significance (2-tailed)	<.001	<.001	<.001	<.001	.259	.069	.003	<.001	

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

Note. The correlation is conducted to examine the correlations between variables without holding constant control variables.

4.3 Student Access to Opportunities and Educational Equity

In this section, both descriptive and inferential statistics are conducted and from different angles. The descriptive statistics will review the rigorous coursework variables—enrollment and exam completion rates—individually and then also combined into a single independent variable. The purpose is to examine how the components individually and collectively impact educational equity. The descriptive statistics include summarizing the data and conducting a correlation analysis. For the inferential statistics, a linear regression will be conducted two ways—first, looking at the rigorous coursework variables individually; and second, with enrollment and exam rates combined. Next, the study will focus on interaction effects. The first step of the interaction effect is to individually apply the rigorous coursework variables, and the final analysis will focus on the interaction effect between the combined rigorous enrollment and exam completion rates variable and the A&I Program participation, on educational equity.

For student access to opportunities, there are two components to this variable. The first component is the three-school-year average enrollment in rigorous coursework for SOCDs. Of the 328 school districts, 288 school districts reported for the three identified school years for students of color, students of disadvantaged backgrounds, or for both for specifically PSEO and concurrent enrollment. There was a significant number of non-reporters for AP and IB course enrollment, and so enrollment was focused on PSEO and concurrent programs. The second component is the rigorous coursework exam completion rates of AP or IB for SOCDs. Of the 328 school districts, 326 school districts reported for the three identified school years for SOCDs. AP exams are open to all students. Students may qualify for college credits if they complete AP coursework and/or take the AP course examination (MDE, 2023c). For the IB,

exams are only open to IB Program students; students who score 4 or higher will receive college credits at colleges and universities worldwide (MDE, 2022d).

Descriptive Statistics of Student Access to Opportunities and Educational Equity

The descriptive statistics reveal that A&I Program participating school districts have higher means for both rigorous coursework enrollment rates and exam completion rates compared to non-participating school districts, 20.71 percent and 7.64 percent respectively as represented in the orange and yellow lines in Figure 4. Non-A&I Program participating school districts reflect means of 12.23 percent for the enrollment rate and 6.22 percent for exam completion rate, as represented with the blue and gray lines respectively in Figure 4. The data of the minimums, means, and maximums are meaningful. At face value, the scores suggest that school districts that invest in reducing disparities are making a difference in terms of SOCDs' rigorous coursework enrollment and exam rates. In particular, the enrollment rates for SOCDs in A&I Program participating school districts have a noticeably larger mean than SOCDs in non-participating school districts.

Next, a Pearson's correlation coefficient (*r)* analysis was conducted to describe the relationship between the two variables (Gravetter & Forzano, 2016). The Pearson correlation describes the relationship between rigorous coursework enrollment and exam completion rate, and educational equity in terms of direction and degree of relationship (Gravetter & Forzano, 2016). The result of the correlations analysis helps depict the general relationship between the independent and dependent variables, while factoring in the control variables. In other words, in SPSS, a partial correlation analysis was conducted to focus on the dependent and independent variables while holding constant the control variables. The correlational analysis reveals that there is a small size, positive correlation between the rigorous exam completion rate and

educational equity at .263, with a statistically significant value of .018. There is also a small positive correlation between rigorous coursework enrollment and educational equity at .179, but this is not statistically significant at .179 which exceeds the accepted p-value of .05. As depicted in Table 8, although this correlation analysis did not indicate a statistically significant correlation between student enrollment in rigorous coursework and educational equity, there is a clear positive correlation between SOCDs rigorous exam completion rate and educational equity that is at a level of statistical significance.

Equally important is how the exam completion rate and enrollment rate combined correlates with educational equity. The result reveals that there is a small positive correlation between the variables at .172, with a p-value of .038 which indicates an acceptable level of statistical significance. Table 9 outlines that the combined variable of enrollment and exam completion rates resulting in a positive correlation with educational equity a p-value of .038. In summary, the finding means that there is an overall positive correlation between SOCDs enrolling and completing rigorous course exams and educational equity. However, when examining enrollment in rigorous coursework alone, there is no indication that there is a correlation between this independent variable and educational equity. Most critical is the statistically significant, medium size, positive correlation between rigorous coursework exam completion rate and educational equity.

Inferential Statistics of Student Access to Opportunities and Educational Equity

To help make generalizations about the population, inferential statistics are conducted to help predict the outcome variable from a predictor variable and a specific parameter (Field, 2018). The study reviews the data in the same manner by examining the rigorous coursework enrollment and exam completion rate individually, and then combined with educational equity.

The Variance Inflation Factor (VIF) values are included to examine multicollinearity which is when two or more independent variables are highly correlated with each other (Bhandari, 2023). A VIF value of 1 means the values are not correlated; a VIF between the values of 1 and 5 means the variables are moderately correlated; and a VIF greater than 5 means the variables are highly correlated (Investopedia, 2023). Anything greater than 5 would mean further investigation is needed. However, it is noted that in situations where there are high VIFs for control variables, the multicollinearities can be ignored (Allison, 2012).

The data for rigorous coursework enrollment produces a linear regression that reflects a small positive relationship between the independent variable and dependent variable, while holding the control variables constant. Specifically, the unstandardized beta value is 2.738, with an overall significance value of .359 indicating the result is not statistically significant as highlighted in Table 10. The VIF value is acceptable at 3.237. The standardized coefficients beta of a .106 reflects a small effect, and again, this result does not signify statistical significance. However, rigorous coursework exam rate for SOCDs positively affects educational equity. The linear regression reflects a 6.942 unstandardized beta value, a standardized coefficients beta of .313, with an overall statistical significance value of .012. This medium size effect is statistically significant with a p-value of less than .05. The VIF value of 2.383 is acceptable. The results can be interpreted accordingly: as SOCDs' exam completion rate increases by one unit, educational equity increases by 6.942. This finding, as shared in Table 11, denotes that there is a positive relationship between SOCDs' rigorous course exam rate and educational equity.

The study examines the rigorous coursework enrollment and exam completion rates together, and the results are found on Table 12. The results indicate that there is a positive relationship overall with a 5.852 unstandardized beta value, and a standardized coefficients beta

of .250, with a p-value of .035 indicating statistical significance. The resulting Adjusted R^2 is .422. This means 42.2% of the variation is explained by the input variables. The findings are independent of the A&I Program participation, but this highlights an important consideration for the A&I Program in terms efforts and investments. Because of the positive correlation between rigorous exam completion rates and educational equity, public programs should consider further investments in this area.

The findings of the linear regression fully support the second hypothesis that increased access to opportunities (enrollment and participation) for SOCDs positively affects educational equity for students in Minnesota's K-12 public school districts. It is important to note that the rigorous coursework exam completion rate variable alone yields a positive, statistically significant relationship with educational equity. The outcome of the linear regression analysis is meaningful because the results support past research that conclude increase enrollment to AP courses is important, however, there needs to be more effective supports and strategies to improve participation by way of exam completion. In other words, increasing rigorous coursework enrollment for SOCDs is not enough. Consequently, school districts should to implement initiatives that increase access to opportunities specifically for SOCDs to successfully complete the exams. It will be important to understand the interaction of rigorous coursework enrollment/exam completion rates and the school district's participation in the A&I Program to determine if there is a positive effect on educational equity.

Hence, as next steps, this study examines the interaction effect of student access to opportunity and the A&I Program on educational equity. The study examines the interaction effects individually—focusing on rigorous coursework enrollment rate, next rigorous coursework exam completion rate—and then the interaction effect of both enrollment and exam completion

rates combined with the A&I Program variable. Starting with the interaction of rigorous coursework enrollment rate and A&I Program participation, there is a positive interaction but not at a statistical significance level. Table 13 reflects the standardized coefficients beta is .098, an unstandardized beta of 2.595, and a statistical significance of .411 which is not accepted as statistically significant. For this reason, we cannot assert that there is an interaction effect between the variables. Conversely, the interaction between the rigorous coursework exam rate and the A&I Program variable results in a positive effect on educational equity for A&I participating school districts as noted in Table 14. The unstandardized beta is 6.841 and the standardized coefficients beta is .304 noting a medium size effect at a statistically significance level of .017. The R^2 value is .441 at a significance level of <.001. This means that rigorous exam completion rate accounts for 44.1% of the variation in educational equity.

Table 15 shows the result of the combined enrollment and exam completion rates and its interaction with the A&I Program participation on educational equity. The interaction of the combined rigorous coursework enrollment and exam rates variable and the A&I Program participation variable produces a positive effect—a standardized coefficients beta of .267 and an unstandardized beta of 6.360. The effect is a small size effect with a significance level of .028. The standardized coefficients beta is a small effect compared to other standardized coefficients beta values in Table 15. However, the unstandardized coefficients beta value denotes that there is a direct impact of the interaction of the two independent variables on the educational equity—with every increase of one unit from the interaction of rigorous coursework enrollment and exam completion rate and A&I Program participation, educational equity increases by 6.360. Nonetheless, the results highlight that the participation of the A&I Program and the support of

SOCDs to enroll in rigorous coursework and complete exams positively impact educational equity—their graduation, attendance, and learning rates.

Table 16 reviews the R^2 value of .447, which explains that the interaction between the A&I Program participation and rigorous coursework enrollment and exam completion rate accounts for 44.7% of the variation in educational equity. This serves as the statistical measure in the regression model as indicated in Figure 5. This figure helps visualize the interaction effect and its relationship on educational equity based on the two groups. The red dots in this figure represent non-participating A&I Program school districts, and the green dots in this figure represent participating A&I Program school districts. The Y axis is the educational equity scores and the X axis is the unstandardized predicted value of the interaction effect. The green dots generate a linear regression (line in blue) that indicates a positive relationship between the combined enrollment/exam completion rate and A&I Program participation on educational equity. The red dots similarly generate a positive interaction effect as well. For the A&I Program participating school districts, the predicted value of Y (educational equity) is represented by $24.71 + 0.41(x)$. This means for every additional unit increase in the interaction of the two independent variables, educational equity improves by 0.41.

Therefore, the third hypothesis is well supported: there is a positive interaction effect between access to opportunities for SOCDs and public funding investment on educational equity. The findings argue for more targeted strategies in this area to accelerate educational equity. With the public program funding, there is strong evidence that increasing access to opportunities both in enrollment and participation (the completion of exams) yield positive results in reducing disparities and advancing educational equity.

Figure 4

Student Access to Opportunity: Average Annual Enrollment in Rigorous Coursework and Exam Completion Rates for School Years 2020, 2021, & 2022

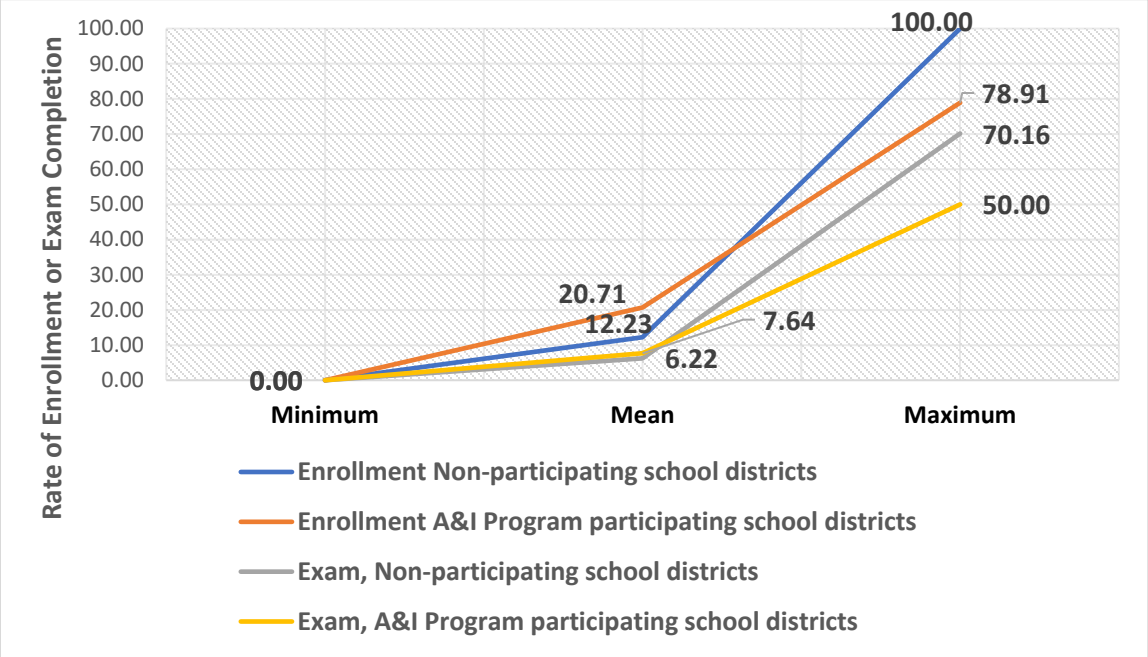


Table 8

Examining the Correlation Between Rigorous Coursework Enrollment Rate, Rigorous Exam Completion Rate, and Educational Equity

Variables		Educational Equity	Rigorous Coursework Enrollment Rate	Rigorous Coursework Exam Completion Rate
Educational Equity (DV)	Correlation	1.000	.151	.263
	Significance (2-tailed)		.179	.018
	df	0	79	79
Rigorous Coursework Enrollment Rate (IV)	Correlation	.151	1.000	.051
	Significance (2-tailed)	.179		.652
	df	79	0	79
Rigorous Coursework Exam Completion Rate (IV)	Correlation	.263	.051	1.000
	Significance (2-tailed)	.018	.652	
	df	79	79	0

Note. The result of the partial correlation analysis includes controlling the following variables: A&I Program revenue amount received, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds.

Table 9

Examining the Correlation Between the Combined Rate of Enrollment and Exam Completion and Educational Equity

Variable		Educational Equity	Rigorous Coursework Exam Completion & Enrollment
Educational Equity (DV)	Correlation	1.000	.172
	Significance (2-tailed)		.038
	df	0	143
Rigorous Coursework Exam Completion & Enrollment (IV)	Correlation	.172	1.000
	Significance (2-tailed)	.038	
	df	143	0

Note. The result of the partial correlation analysis includes controlling the following variables: A&I Program revenue amount received, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds.

Table 10

Linear Regression: The Relationship Between Rigorous Coursework Enrollment Rate and Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	60.410	1.008		59.938	<.001	

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Rigorous Coursework Enrollment Rate (IV)	2.738	2.973	.106	.921	.359	3.237
Control 1: A&I Program Revenue	6.575	3.827	.536	1.718	.088	23.879
Control 2: School District Enrollment Size	-22.518	5.003	-1.375	-4.501	<.001	22.955
Control 3: Maximum Levy Amount	12.205	3.067	.889	3.979	<.001	12.269
Control 4: Student Demographic, Race / Ethnicity	-10.106	3.855	-.410	-2.622	.010	6.008
Control 5: Student Demographic, Disadvantaged Background	-22.267	5.931	-.431	-3.754	<.001	3.243

Note. The result of the linear regression includes controlling the following variables: A&I program revenue, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds. The adjusted R^2 is .410.

Table 11

Linear Regression: The Relationship Between Rigorous Coursework Exam Completion Rate and Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	60.798	1.533		39.652	<.001	
Rigorous Coursework Exam Completion Rate (IV)	6.942	2.714	.313	2.557	.012	2.383

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Control 1: A&I Program Revenue	5.454	5.019	.471	1.087	.280	29.832
Control 2: School District Enrollment Size	-6.631	7.271	-.405	-.912	.364	31.326
Control 3: Maximum Levy Amount	-3.407	4.985	-.252	-.684	.496	21.596
Control 4: Student Demographic, Race / Ethnicity	-2.251	5.192	-.091	-.433	.666	7.00
Control 5: Student Demographic, Disadvantaged Background	-36.830	6.253	-.866	-5.890	<.001	3.433

Note. The result of the linear regression includes controlling the following variables: A&I program revenue, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds. The adjusted R^2 is .440.

Table 12

Linear Regression: The Relationship between Rigorous Coursework Enrollment and Exam Completion Rates, and Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	60.606	.981		61.756	<.001	
Rigorous Coursework Exam Completion Rate	5.852	2.746	.250	2.131	.035	3.542
Control 1: A&I Program Revenue	7.247	3.672	.595	1.974	.050	23.397
Control 2: School District Enrollment Size	-22.720	4.872	-1.392	-4.664	<.001	22.963
Control 3: Maximum Levy Amount	11.114	2.991	.810	3.715	<.001	12.236

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Control 4: Student Demographic, Race / Ethnicity	-12.630	3.774	-.517	-3.346	.001	6.146
Control 5: Student Demographic, Disadvantaged Background	-22.697	5.682	-.445	-3.995	<.001	3.205

Note. The result of the linear regression includes controlling the following variables: A&I program revenue, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds. The Adjusted R^2 is .422.

Table 13

Interaction Effect Between Rigorous Coursework Enrollment Rate and A&I Program Participation on Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	60.350	1.041		57.965	<.001	
Interaction: Rigorous Coursework Enrollment Rate and A&I Program Participation	2.595	3.147	.098	.825	.411	3.333
Control 1: A&I Program Revenue	7.495	3.942	.614	1.901	.059	24.568
Control 2: School District Enrollment Size	-21.052	5.121	-1.295	-4.111	<.001	23.397
Control 3: Maximum Levy Amount	10.743	3.116	.782	3.448	<.001	12.112
Control 4: Student	-11.309	4.033	-.455	-2.804	.006	6.220

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Demographic, Race / Ethnicity						
Control 5: Student Demographic, Disadvantaged Background	-21.149	6.099	-.407	-3.467	<.001	3.241

Note. The result of the interaction effect is based on a multiple regression including all five control variables, and the interaction of A&I Program and rigorous coursework enrollment variables.

Table 14

Interaction Effect Between Rigorous Coursework Exam Completion Rate and A&I Program Participation on Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	60.534	1.578		38.367	<.001	
Interaction: Rigorous Coursework Exam Completion Rate and A&I Program Participation	6.841	2.802	.304	2.442	.017	2.358
Control 1: A&I Program Revenue	7.409	5.032	.658	1.472	.145	30.355
Control 2: School District Enrollment Size	-3.111	7.134	-.196	-.436	.664	30.725
Control 3: Maximum Levy Amount	-7.199	4.942	-.538	-1.457	.149	20.767
Control 4: Student	-3.835	5.330	-.154	-.719	.474	6.944

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Demographic, Race / Ethnicity						
Control 5: Student Demographic, Disadvantaged Background	-37.452	6.485	-.869	-5.775	<.001	3.441

Note. The result of the interaction effect is based on a multiple regression including all five control variables and the interaction of the rigorous coursework exam completion rate and A&I Program participation variables.

Table 15

Interaction Effect Between the Combined Enrollment / Exam Completion Rates and A&I Program Participation, on Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	88.397	9.861		8.964	<.001	
Interaction: Rigorous Coursework Enrollment / Exam Completion Rate and A&I Program Participation	6.360	2.873	.267	2.212	.028	3.732
Control 1: A&I Program Revenue	7.704	3.754	.632	2.052	.042	24.352
Control 2: School District Enrollment Size	-23.275	4.966	-1.426	-4.687	<.001	23.753
Control 3: Maximum Levy Amount	11.097	2.998	.808	3.701	<.001	12.237
Control 4: Student Demographic, Race / Ethnicity	-13.217	3.902	-.541	-3.388	<.001	6.539

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Control 5: Student Demographic, Disadvantaged Background	-22.860	5.701	-.449	-4.010	<.001	3.212

Note. The result of the interaction effect is based on a multiple regression including all five control variables and the interaction of A&I Program and rigorous coursework enrollment/exam completion rate. The adjusted R^2 is .419.

Table 16

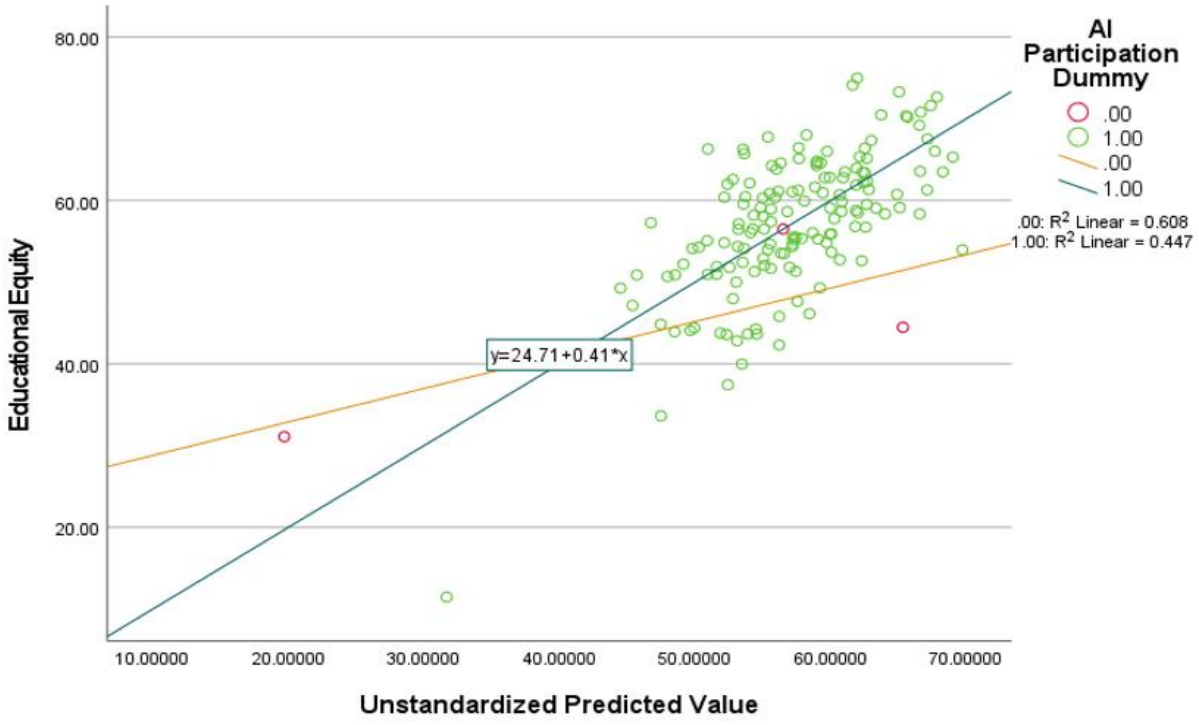
Model Summary of the Interaction Effect Between the Combined Enrollment / Exam Completion Rates and A&I Program Participation on Educational Equity

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
.668	.447	.419	6.408	.447	16.366	7	142	<.001

Note. Dependent Variable: Educational Equity.

Figure 5

Interaction Effect: Scatter Plot and Linear Regression Between the Combined Enrollment / Exam Completion Rates and A&I Program Participation on Educational Equity



Note. A&I Program Participation Dummy represents two groups: .00 = non-participating school districts and 1.00 = participating school districts. The X axis denotes the unstandardized predicted value which is the interaction effect between A&I Program participation and rigorous coursework enrollment/exam completion rate.

4.4 Teacher Workforce Diversity and Educational Equity

For this data analysis, 327 school districts reported number of teachers of color employed for the three school years identified. One non-participating school district did not report on their number count for teachers of color in these three school years. Increasing the number of teachers of color has been identified as a priority for Minnesota and the across the nation (MDE, 2023g). Specifically, in Minnesota, teachers of color make up six percent of the workforce (statewide

rate) with a student population of 37 percent for students of color or American Indian students (MDE, 2023g). This data analysis will provide summary data to generally describe the data and compare between the two groups. Also, as part of the descriptive statistics, the study will conduct a correlation between the two variables—teachers of color (independent) and educational equity (dependent). Lastly, this analysis will include inferential statistics by conducting a linear regression between the two variables, and an interaction analysis between teacher workforce diversity and public funding investment on educational equity.

Descriptive Statistics of Teacher Workforce Diversity

Overall, for the percentage of teachers of color in Minnesota for school years 2020, 2021, and 2022 across all school districts, the mean rate was 2.286%, with a minimum of 0% and a maximum of 21.5%. When examining by teachers of color count, the range is significant of 526.790: minimum at 0 and maximum at 526.790. The mean is 8.136. However, when comparing the data between the two groups (participating and non-participating school districts), the results are notable. Figure 6 reflects the differences between the two groups.

The data suggests that the school districts that participate in the A&I Program have more teachers of color on average compared to non-participating school districts. Figure 6 reveals the significant differences between the mean and maximum average counts between A&I participating school districts and non-participating school districts for employed teachers of color for the three school years: 2020, 2021, and 2022. The data also suggests perhaps that there is still a lot of work to do, in order to significantly increase the number of teachers of color in Minnesota public schools.

Next, a Pearson's correlation coefficient (*r)* analysis was conducted to describe the relationship between the two variables (teachers of color and educational equity) which provides

the general direction and degree of the relationship (Gravetter & Forzano, 2016). The result of the correlation analysis is a -.150 with a p-value of .106 indicating that the result is not statistically significant. In other words, there is no apparent statistically significant correlation between teachers of color and educational equity for the three school years being studied. Table 17 highlights the results of this correlation analysis and its lack of statistical significance.

Inferential Statistics for Teacher Workforce Diversity and Educational Equity

A linear regression was conducted to generalize the findings for the Minnesota school districts. This linear regression is important to see the relationship between teachers of color and educational equity, and predict its trajectory (Gravetter & Forzano, 2016). Table 18 notes the results of the linear regression for teachers of color and educational equity. The study uses the linear regression to understand and apply the findings to study's population—Minnesota school districts. The result of the linear regression analysis shows a slightly negative relationship between teachers of color and educational equity with a standardized coefficients beta of -.142; however, the data is not at a level of statistical significance reflecting .106. Like the correlation analysis, the linear regression does not generate results that are statistically significant. For this reason, this finding does not support the fourth hypothesis of this study: Teacher workforce diversity positively affects educational equity for students in Minnesota's K-12 public schools.

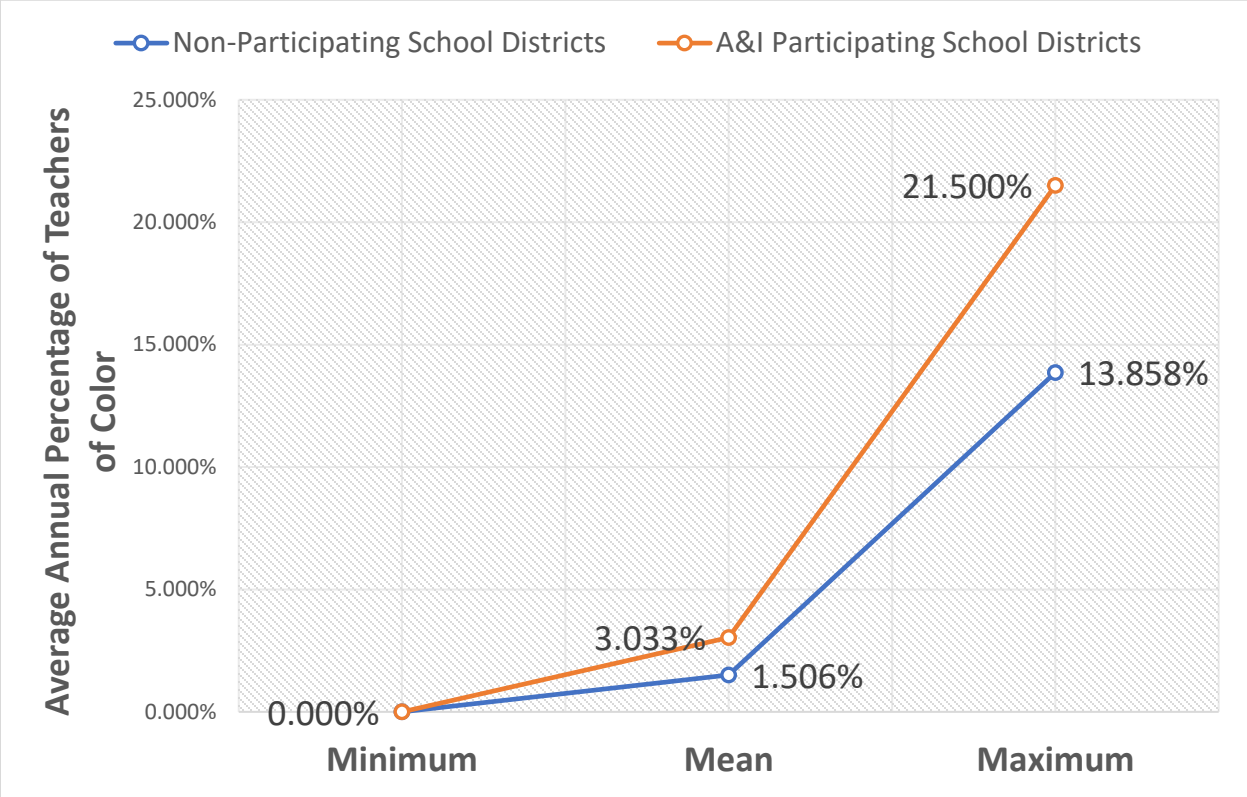
Lastly, the interaction effect between teachers of color and A&I Program funding on educational equity also does not provide results that are at a level of statistical significance reflecting a p-value of .099. The findings indicate an interaction effect with an unstandardized beta value of -3.141 and a standardized coefficients beta value at -.147. But, again, the p-value exceeds the acceptable threshold for statistical significance at .099. Therefore, the interaction effect between teachers of color and A&I Program funding does not impact educational equity at

a level of statistical significance. Consequently, the study's remaining hypothesis is not supported: there is a positive interaction effect between teacher workforce diversity and public funding investment on educational equity. The findings indicate that given the low number of teachers of color in the workforce, the data does not produce results at a level of statistical significance when examining its interaction with the A&I program and relationship with educational equity. The findings suggest that there may be an opportunity to do a longitudinal study to better understand the trends across several school years. It may also be important to conduct this same research again in the future, once there is substantial data or an increase in the number of teachers of color.

In conclusion, Table 20 provides a summary of the study's hypotheses and corresponding findings based on the data analyses. In summary, two of the five hypotheses are not supported, and three of the five hypotheses are supported.

Figure 6

Teachers of Color Average Percentage for School Years 2020, 2021, and 2022: Comparing the Minimums, Means, and Maximums



Note. Minimum, mean, and maximum data points are compared between A&I participating school districts and non-participating school districts.

Table 17

Correlation Analysis of Teachers of Color and Educational Equity

Variable		Educational Equity	Teachers of Color
Educational Equity	Correlation	1.000	-.150
	Significance (2-tailed)		.106
	df	0	115
Teachers of Color	Correlation	-.150	1.000
	Significance (2-tailed)	.106	
	df	115	0

Note. The result of the partial correlation analysis includes controlling the following variables: A&I Program revenue amount received, school district enrollment size, maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds.

Table 18

Linear Regression for Teachers of Color and Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	58.333	1.236		47.198	<.001	
Teachers of Color (IV)	-3.013	1.850	-.142	-1.629	.106	1.625
Control 1: A&I Program Revenue	4.484	4.101	.368	1.093	.277	24.224
Control 2: School District Enrollment Size	-17.041	5.536	-1.020	-3.078	.003	23.475
Control 3: Maximum Levy Amount	11.008	3.237	.801	3.401	<.001	11.872
Control 4: Student Demographic, Race / Ethnicity	-4.416	4.291	-.174	-1.028	.305	6.090
Control 5: Student Demographic, Disadvantaged Background	-23.243	6.007	-.466	-3.869	<.001	3.108

Note. Dependent Variable: Educational Equity. The result of the linear regression includes controlling the following variables: maximum allowable tax levy amount, demographic rate of students of color and demographic rate of students of disadvantaged backgrounds. The adjusted R^2 value is .434.

Table 19

Interaction Effect Between Teachers of Color and A&I Program Participation, on Educational Equity

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	VIF
Educational Equity (Constant / DV)	58.128	1.363		46.070	<.001	
Interaction between Teachers of Color (IV) and A&I Program Participation	-3.141	1.891	-.147	-1.661	.099	1.624
Control 1: A&I Program Revenue	4.849	4.192	.402	1.157	.250	25.057
Control 2: School District Enrollment Size	-15.009	5.604	-.911	-2.678	.008	23.977
Control 3: Maximum Levy Amount	9.576	3.260	.698	2.937	.004	11.725
Control 4: Student Demographic, Race / Ethnicity	-5.213	4.378	-.204	-1.191	.236	6.080
Control 5: Student Demographic, Disadvantaged Background	-22.379	6.135	-.446	-3.648	<.001	3.100

Note. The result of the interaction effect is based on a multiple regression including all five control variables, and the interaction of A&I Program and teachers of color. The adjusted R^2 is .412.

Table 20

Summary of Research Hypotheses and Findings

No.	Hypotheses	Findings
1	Public funding investment (A&I Program participation) has no effect on educational equity for Minnesota K-12 public school districts.	Supported, there is no evidence that public funding investment (A&I Program participation) alone impacts educational equity on a level of statistical significance.
2	Increased access to educational opportunities (enrollment and participation) for SOCDs positively affects educational equity in Minnesota's K-12 public school districts.	Supported, increased access to educational opportunities (enrollment and participation) for SOCDs positively affects educational equity in Minnesota's K-12 public school districts.
3	There is a positive interaction effect between access to opportunities for SOCDs and public funding investment on educational equity.	Supported, there is a statistically significant variable interaction between SOCDs' access to educational opportunities and public funding investment on educational equity.
4	Teacher workforce diversity positively affects educational equity for students in Minnesota's K-12 public school districts.	Not Supported, there is no evidence that teacher workforce diversity affects educational equity at a level of statistical significance.
5	There is a positive interaction effect between teacher workforce diversity and public funding investment on educational equity.	Not Supported, there is no evidence of a statistically significant interaction effect between teacher workforce diversity and public funding investment on educational equity.

CHAPTER 5

5. CONCLUSIONS AND RECOMMENDATIONS

This chapter provides recommendations and suggested next steps for advancing educational equity in Minnesota's K-12 public school districts. This research focuses on public funding investments by examining one program in specific, the A&I Program which has been operational since the 2013-2014 school year. This chapter offers strategies to consider in accelerating educational equity with the use of A&I Program funding. Additionally, this research highlights the opportunities for Minnesota to invest in efforts to increase student access to educational opportunities and teacher workforce diversity. Increasing student access to rigorous coursework is a strategy to effectively improve educational equity based on the results of this study. Additionally, the message is clear that there is a significant need to progressively increase teacher workforce diversity to dismantle systemic educational inequities. Lastly, this study spotlights educational equity, to advocate for a baseline to understand the current state and determine how to move forward to implement improvements and make the change we truly need in Minnesota's school districts.

5.1. Achievement and Integration Program and Teachers of Color

The A&I Program has been in operations since the 2013-2014 school year. And with the findings in this study, there is evidence that there are more teachers of color in classrooms for school districts that participate in this program. When looking at the averages between the two groups for teachers of color, it provides meaningful insight that the A&I Program is making progress in this area. Especially given the challenges of the time period studied—during the COVID-19 pandemic.

The three-year average for teachers of color reflects very low numbers: 1.51 percent for non-participating school districts and 3.03 percent for A&I Program participating school districts. For school districts that participated in the A&I Program, they have double the number of teachers of color compared to non-participating school districts. To really understand the difference, the number count of teachers of color is more telling. The three-year average for non-participating school district, the actual count is 271.22 teachers of color. For A&I Program participating school districts that number is 2,393.68 for teachers of color. The number count difference is astounding. Although we cannot attribute the hiring and retention of teachers of color in school districts to the A&I Program solely, we can safely assume that A&I Program participating school districts are generally doing better in terms of hiring and retaining teachers of color, compared to non-participating school districts.

Moreover, the A&I Program is a leading initiative in supporting school districts' efforts to increase teachers of color in the classrooms (MN PESLB, MDE & OHE, 2023). The funding reported in 2023 indicates an annual investment of about $97 million, which is significantly higher compared to other public programs specifically for increasing the number of teachers of color (MN PESLB, MDE & OHE, 2023). Other public programs include Come Teach in Minnesota with funding of $200,000-400,000 on an annual basis, Grow Your Own—Early Childhood Educators with funding of approximately $2.5 million in fiscal year (FY) 2024-2025, and Grow Your Own—Teacher Diversity in the amount of $25 million in FY 24. (MN PESLB, MDE & OHE, 2023). This highlights an opportunity to look at other public programs, their efforts to increase teachers of color, and their impacts on educational equity.

The linear regression and interaction effect analysis via a multiple regression did not yield statistically significant results. While this is disappointing, it is not surprising. In 2015, the

statewide rate for teachers of color was at four percent, at the end of June 30, 2021 teachers of color made up 5.64 percent, and the recent MN PELSB publication in August 2023 confirms a 5.9 percent of teachers of color (Minnesota Education Equity Partnership [MnEEP], 2015; MN PESLB, 2021; MN PESLB, 2023). The data trends support the inability to make conclusions at this time about teachers of color and their impact on educational equity. Similar to the findings of this study, MN PELSB (2021) notes that future data is needed to analyze and better understand the trends and patterns for teachers of color. More importantly, this trend underscores the slow growth of teachers of color in the Minnesota workforce. Given the more recent efforts to increase teachers of color mainly through legislative changes, it will take time before Minnesota achieves the desired outcome. The growth in the number of teachers of color in the coming years will help with future data analysis—understanding the correlation and determining the relationship with educational equity. Nonetheless, to effectively increase teachers of color in the workforce it requires a multifaceted approach.

An important aspect to note is the actual number count of teachers of color actively teaching compared to individuals of color who hold licenses to teach in Minnesota but are not teaching. In other words, there are individuals of color who hold teacher licenses who are not actively teaching. MN PELSB (2021) reports a critical finding in that more than half of teachers, at a Tier 3 or 4 licensure, are not teaching in classrooms. Nearly a third of new teachers do not stay in the profession and depart within the first five years (MN PELSB, 2021). Specifically, as reported on June 30, 2020, the total number of licensed teachers reflect 113,986, with only 56,628 teachers who have active licenses (MN PELSB, 2021). When examining the percent of teachers holding a license by race and ethnicity, there are over 6,000 individuals who hold teaching licenses who are of color or have an indigenous background (MN PELSB, 2021). Based

on the data in the three identified school years as part of this research, on average, the teachers of color count is 2,660 on annual basis. This means roughly 44% of licensed teachers of color were actively teaching during the three-year period. The data supports the argument that the current environment and infrastructure are not conducive for the sustainability of teachers of color in public schools. There is a need for effective, long-term strategies that address systemic issues and institutional racism that serve as barriers for teachers of color in the Minnesota workforce. For this reason, it will be important to explore why teachers of color are not entering the profession and why they are leaving the workforce so to better invest in efforts that truly matter.

The recommendation is for Minnesota to continue proposing and implementing policy changes to increase the number of teachers of color coming into the profession, and to effectively invest in a continuum of supports for those teachers of color to remain engaged and successful in the field. It seems like we may be on the path to implementing some of these policy changes, but the infrastructure, support, and resources are currently insufficient to develop and grow new teachers of color in a sustainable manner. The Minnesota Education Equity Partnership (MnEEP) (2015) suggests a "holistic pipeline" to include resources and supports to ensure teachers' needs are met at each step of their development in the profession (p. 3). The pipeline focuses on three phases: recruitment (hiring of teachers of color), induction (the first five years), and retention (beyond the five years) (MnEEP, 2015). MDE has in place programs such as Minnesota's Induction and Mentoring Program; however, these efforts are still very much in the piloting phase and so it will be important to review the results of the pilot and implement substantial change with a commitment to continuous improvement.

5.2. Achievement and Integration Program and Student Access to Educational Opportunities

Like the data for teachers of color, the three-year average for rigorous coursework enrollment and exam completion rate for SOCDs is higher in A&I Program participating school districts compared to non-participating school districts. For A&I Program participating school districts, the enrollment rate for SOCDs resulted in a mean of 20.71 percent compared to 12.23 percent for non-participating school districts. For the exam completion rates, again the A&I Program participating school districts also scored slightly higher at 7.64 percent compared to 6.22 percent for non-participating school districts. The differences between the two school district groups are noteworthy. SOCDs in school districts that participate in the A&I Program have a higher rigorous coursework enrollment rate and exam completion rate. Although the higher rates cannot be contributed directly to the A&I Program, just by looking at the minimums, means, and maximums, the data provides a general sense of where the significant gaps are and the opportunities for further exploration.

Through the linear regression analysis, the results indicate that rigorous coursework exam completion rate positively affects educational equity. Furthermore, rigorous coursework enrollment and exam completion rates together result in a small, positive effect that is statistically significant in the linear regression. The interaction of the combined rigorous coursework enrollment and exam rates variable and the A&I Program participation variable produces a positive effect—a standardized coefficients beta of .267 and an unstandardized beta of 6.360. The effect is a small size effect with a significance level of .028. However, rigorous coursework enrollment rate alone does not result in a positive effect on educational equity at a level of statistical significance. The findings support the argument that increasing the enrollment of SOCDs in rigorous coursework is not enough. In fact, the rigorous coursework exam

completion rate variable alone positively affects educational equity for SOCDs in Minnesota school districts resulting in a medium size effect. Thus, the overall findings indicate the important work of not only enrolling SOCDs in rigorous coursework, but also that there must be strategies implemented to support, coach/teach, and provide mentorship to these students for successful AP and/or IB exam completion. The results of the interaction effect suggests that public programs and funding investments play an important role in carrying out policy change and improving educational equity.

The suggested next step is for the A&I Program to consider advocating for this specific strategy as part of the program across the state. Specifically, the program should consider increasing supports to SOCDs to enroll and complete rigorous coursework exams, if this is not already a program priority. This study emphasizes the direct relationship between rigorous exam completion and educational equity. Enrollment in rigorous coursework will not do it alone, however, it may be the first step toward improved educational equity. Increasing the rate of SOCDs' completion of exams is the next step as part of the journey toward eliminating educational disparities, and the A&I Program has an opportunity to design and advocate for this next step. Additionally, in Minnesota, we may be focused on equally important efforts such as increasing teachers of color in the workforce. However, the strategy to support, grow, and develop SOCDs must not live in the shadow of other efforts. This is one strategy that can really make an impact for future generations of individuals of color in the workforce, including growing teachers of color in the profession. The stakeholder theory applies specifically to this strategy: it is important to understand the immediate and long-term benefits of increasing educational opportunities for SOCDs. SOCDs who benefit from this effort will, at some point, contribute to the community and serve in future roles to further a greater good. These individuals

will play an essential role in changing the existing framework and dismantling barriers for SOCDs.

5.3. Educational Equity

This last section covers the importance of defining and measuring educational equity, and concludes this study with final recommendations for next steps in the field of eliminating educational disparities for SOCDs.

Across the three elements for educational equity—graduation, learning, and attendance rates—the learning rate is the lowest score across Minnesota's public school districts. This highlights the great need to invest in strategies to improve learning rates for students across the state. A couple of questions surface in this study: whether standardized testing is truly the way to measure learning, and whether there are other ways to capture and measure learning especially for SOCDs. This is also an opportunity for the A&I Program to determine other ways to measure and improve learning for SOCDs. Although achievement may be easily measured through standardized tests, it is not the most effective way to measure learning or academic achievement for many students and communities. What other supports or resources are needed in the school setting to engage, develop, and grow SOCDs? This is an opportunity for further exploration, and it requires a better understanding of SOCDs—their communities and relevant stakeholders, learning styles, and career aspirations. Further exploration will be important to produce more effective strategies to grow and develop students in the most meaningful way.

Educational equity is not well-defined, and there are no best practices or standard approaches to reducing disparities in the school setting. For these reasons, educational equity is difficult to measure. This study proposes that educational equity is made up of three elements for SOCDs—graduation, learning, and attendance rates. This is one way to measure educational

equity and clearly not the only way. However, the point of defining educational equity in this way is to establish a baseline or a starting point. This starting point then allows us to measure and determine the path forward; to make improvements and adjustments; and to learn and unlearn together to further the work of eliminating educational disparities. The recommendation is to start here, to use this as the baseline as the data continues to change, student demographic diversifies, teachers of color increase, and institutions are reshaped.

Can Minnesota's K-12 public school districts achieve educational equity through public funding investment, teacher workforce diversity, and improved access to opportunities for students of color and disadvantaged backgrounds? Yes, Minnesota can achieve educational equity through public funding investments when the funding is used specifically to improve SOCDs' access to educational opportunities through both increased enrollment and participation of rigorous coursework. The most critical factor is SOCDs' completion of rigorous coursework examinations. Public funding investment, in this particular study—the A&I Program, alone will not directly contribute to educational equity. Teacher workforce diversity's correlation and relationship with educational equity are yet to be determined. Further data and efforts are needed before analysis can be conducted to determine the strength and significance of the relationship. In summary, there is still significant work to do, in order to effectively increase the number of teachers of color in the workforce, but there is evidence of the positive correlation and relationship between SOCDs' rigorous coursework enrollment and completion of exams and educational equity; and, there is evidence of a positive interaction effect between public funding and SOCDs' access to educational opportunities on educational equity.

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Exhibit 1

Table 21

A&I Program Revenue Per Independent School District (ISD): 2020, 2021, and 2022

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
2396	A.C.G.C. Public Schools	$55,957	$35,359	$74,672
511	Adrian Public Schools	$50,561	$62,980	$57,119
745	Albany School District	$27,259	$37,229	$38,334
241	Albert Lea Public Schools	$307,589	$327,938	$370,432
876	Annandale Public Schools	$114,398	$125,696	$133,091
11	Anoka-Hennepin Public Schools	$6,354,012	$6,632,873	$7,226,707
492	Austin Public Schools	$824,983	$837,132	$889,327
2534	B.O.L.D. Public Schools	$45,816	$58,253	$ 59,811
162	Bagley Public Schools	$47,889	$94,160	$92,967
542	Battle Lake Public Schools	$30,340	$29,344	$34,500
726	Becker Public Schools	$252,053	$277,468	$275,784
2364	Belgrade-Brooten-Elrosa	$19,588	$23,578	$26,596
271	Bloomington Public Schools	$1,946,239	$1,979,935	$2,041,412
286	Brooklyn Center Public Schools	$760,630	$763,630	$709,861
877	Buffalo-Hanover-Montrose Area Schools	$565,784	$563,476	$561,554
191	Burnsville-Eagan-Savage Public Schools	$1,982,951	$2,011,542	$1,962,434
836	Butterfield-Odin Public Schools	$36,597	$56,552	$33,842
531	Byron Public Schools	$79,652	$74,543	$71,539
891	Canby School District	$45,852	$48,866	$45,111
93	Carlton Public Schools	$15,404	$24,106	$19,622
2754	Cedar Mountain Public Schools	$43,924	$39,032	$34,629
227	Chatfield Public Schools	$19,500	$23,662	$25,579
2311	Clearbrook-Gonvick Public Schools	$40,401	$47,889	$49,985
94	Cloquet Public Schools	$236,429	$302,629	$267,676
13	Columbia Heights Public Schools	$1,007,596	$1,050,824	$1,029,960
81	Comfrey Public Schools	$ 8,532	$4,927	$12,851
95	Cromwell-Wright Public Schools	$4,419	$9,149	$4,076
593	Crookston Public Schools	$127,455	$152,406	$144,688
378	Dawson-Boyd Public Schools	$48,530	$42,617	$42,557
317	Deer River Public Schools	$67,774	$128,386	$172,282

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
22	Detroit Lakes Public Schools	$256,901	$293,082	$299,492
533	Dover-Eyota Public Schools	$34,500	$39,799	$36,734
709	Duluth Public Schools	$1,662,461	$1,688,780	$1,690,077
2580	East Central Public Schools	$44,588	$55,462	$52,437
595	East Grand Forks Public Schools	$166,938	$196,569	$207,100
112	Eastern Carver County	$942,821	$876,411	$940,937
272	Eden Prairie Public Schools	$1,364,490	$1,449,870	$1,486,042
581	Edgerton	$40,154	$36,395	$42,557
273	Edina Public Schools	$1,037,715	$1,110,052	$1,212,483
728	Elk River Area School District	$1,423,191	$1,428,964	$1,419,088
514	Ellsworth Public Schools	$11,297	$14,137	$14,075
656	Faribault Public Schools	$704,674	$717,253	$734,559
544	Fergus Falls Public Schools	$300,475	$308,274	$318,180
51	Foley Public Schools	$112,209	$112,009	$105,115
831	Forest Lake Area Schools	$636,446	$689,180	$721,545
601	Fosston Public Schools	$34,461	$39,526	$37,570
23	Frazee-Vergas Public Schools	$65,641	$65,507	$71,928
14	Fridley Public Schools	$738,279	$762,284	$755,147
505	Fulda Public Schools	$33,272	$47,787	$49,069
2365	GFW Public Schools	$65,092	$62,666	$57,505
318	Grand Rapids Public Schools	$105,734	$169,051	$252,262
200	Hastings Public Schools	$262,034	$271,040	$172,135
150	Hawley Public Schools	$46,335	$47,046	$46,760
203	Hayfield Public Schools	$19,955	$29,373	$18,915
330	Heron Lake-Okabena Public Schools	$28,467	$39,924	$39,252
2	Hill City Public Schools	$2,473	$16,516	$7,334
2165	Hinckley-Finlayson	$107,875	$114,675	$114,104
738	Holdingford Public Schools	$56,300	$57,926	$57,482
270	Hopkins Public Schools	$1,383,766	$1,314,047	$1,387,550
199	Inver Grove Heights Public Schools	$676,833	$650,309	$635,638
403	Ivanhoe Public Schools	$9,830	$15,549	$14,386
2895	Jackson County Central Schools	$95,315	$110,011	$113,915
2835	Janesville-Waldorf-Pemberton Schools	$24,813	$22,516	$21,690
717	Jordan Public Schools	$152,879	$169,724	$171,204
36	Kelliher Public Schools	$52,087	$52,821	$56,418

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
2172	Kenyon-Wanamingo Public Schools	$31,193	$29,286	$35,227
775	Kerkhoven-Murdock-Sunburg Public Schools	$71,815	$71,789	$81,239
739	Kimball Public Schools	$29,327	$33,497	$32,387
2071	Lake Crystal Wellcome Memorial School District	$63,825	$50,966	$60,200
390	Lake of the Woods Public Schools	$19,110	$15,942	$13,585
2167	Lakeview Public Schools	$40,791	$45,587	$46,309
194	Lakeville Public Schools	$1,068,627	$1,235,717	$1,434,451
2753	Long Prairie-Grey Eagle Public Schools	$176,373	$184,051	$198,510
497	Lyle Public Schools	$3,801	$13,288	$8,871
415	Lynd Public Schools	$29,703	$30,199	$28,721
2180	M.A.C.C.R.A.Y.	$71,141	$76,528	$82,016
837	Madelia Public Schools	$96,853	$113,611	$87,629
432	Mahnomen Public Schools	$148,992	$195,599	$199,056
832	Mahtomedi Public Schools	$320,578	$326,307	$277,188
77	Mankato	$885,460	$870,432	$884,617
2135	Maple River Public Schools	$93,679	$95,127	$87,221
413	Marshall Public Schools	$467,984	$469,781	$474,963
2448	Martin County West Public Schools	$30,181	$40,558	$16,618
4	McGregor Public Schools	$44,754	$47,961	$36,823
740	Melrose Public Schools	$128,921	$163,379	$156,237
635	Milroy Public Schools	$3,658	$3,658	$3,658
1	Minneapolis Public Schools	$11,594,532	$12,645,992	$13,404,993
414	Minneota Public Schools	$33,542	$28,960	$29,269
129	Montevideo Public Schools	$219,217	$204,099	$211,099
882	Monticello Public Schools	$234,832	$288,714	$273,578
152	Moorhead Public Schools	$835,687	$864,413	$877,902
621	Mounds View Public Schools	$1,438,806	$1,699,048	$1,483,335
173	Mountain Lake Public Schools	$82,939	$84,049	$83,350
2169	Murray County Central Public Schools	$46,113	$56,880	$47,224
345	New London-Spicer Public Schools	$111,474	$138,836	$127,864
88	New Ulm Public Schools	$149,152	$148,318	$147,652

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
622	North St. Paul-Maplewood-Oakdale Public Schools	$2,147,779	$2,706,330	$2,710,718
2215	Norman County East Public Schools	$19,191	$17,243	$16,086
659	Northfield Public Schools	$294,671	$328,570	$314,409
118	Northland Community Schools	$44,120	$ 42,989	$46,502
480	Onamia Public Schools	$128,649	$128,717	$123,988
278	Orono Public School District	$128,131	$123,861	$124,600
213	Osakis Public Schools	$55,379	$20,365	$58,712
279	Osseo Public Schools	$4,641,554	$4,711,206	$4,857,792
761	Owatonna Public Schools	$485,557	$457,689	$445,624
309	Park Rapids Public Schools	$82,660	$105,745	$90,815
741	Paynesville Public Schools	$23,141	$24,705	$28,975
548	Pelican Rapids Public Schools	$167,482	$156,491	$154,704
549	Perham-Dent Public Schools	$73,442	$66,983	$69,483
484	Pierz Public Schools	$18,858	$29,804	$31,219
578	Pine City Public Schools	$67,870	$65,992	$16,848
255	Pine Island Public Schools	$39,226	$33,485	$39,992
2869	Pipestone Public Schools	$102,249	$111,322	$109,925
2899	Plainview-Elgin-Millville Public Schools	$70,641	$72,441	$70,211
719	Prior Lake-Savage Area Schools	$12,863	$367,008	$770,993
704	Proctor Public Schools	$78,885	$90,464	$84,980
38	Red Lake Public Schools	$166,464	$310,875	$296,800
2884	Red Rock Central Public Schools	$35,644	$18,643	$24,066
2897	Redwood Area Schools	$137,436	$102,505	$106,007
2890	Renville County West Public Schools	$65,516	$49,971	$28,538
280	Richfield Public Schools	$1,109,118	$1,167,409	$1,132,602
281	Robbinsdale Area Schools	$2,773,806	$2,752,789	$2,786,465
535	Rochester Public Schools	$3,011,791	$2,999,294	$3,157,606
883	Rockford Public Schools	$186,444	$174,057	$182,302
750	Rocori School District	$111,534	$130,505	$139,427
196	Rosemount-Apple Valley-Eagan Public Schools	$4,946,624	$4,865,630	$5,355,931
623	Roseville Area Schools	$1,702,835	$1,697,840	$1,664,286
2907	Round Lake-Brewster	$103,439	$110,084	$111,496
2902	RTR Public Schools	$33,511	$41,481	$37,382
743	Sauk Centre Public Schools	$82,431	$79,855	$88,947

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
47	Sauk Rapids-Rice Public Schools	$279,633	$233,997	$297,424
720	Shakopee Public Schools	$1,342,666	$1,442,414	$1,450,833
2310	Sibley East Public Schools	$167,121	$155,691	$169,436
84	Sleepy Eye Public Schools	$85,880	$92,769	$89,753
363	South Koochiching Public Schools	$1,163	$16,146	$22,598
6	South St. Paul Public Schools	$587,304	$504,760	$498,429
833	South Washington County Schools	$2,880,473	$2,670,010	$2,897,756
500	Southland Public Schools	$29,074	$30,446	$29,306
16	Spring Lake Park	$1,017,778	$1,101,347	$1,107,084
85	Springfield Public Schools	$45,466	$42,480	$42,597
282	St. Anthony-New Brighton Schools	$258,337	$266,486	$243,414
742	St. Cloud Public Schools	$2,031,884	$2,123,015	$2,124,801
840	St. James Public Schools	$196,632	$213,495	$217,807
2142	St. Louis County School District	$1,748	$76,738	$86,343
283	St. Louis Park Public Schools	$801,738	$787,025	$786,105
508	St. Peter Public School District	$195,686	$269,319	$273,342
625	Saint Paul Public Schools	$15,527,014	$15,616,988	$15,261,057
534	Stewartville Public Schools	$94,437	$109,003	$116,991
834	Stillwater Area Public Schools	$852,452	$946,052	$1,110,801
564	Thief River Falls Public Schools	$123,721	$146,414	$123,108
2904	Tracy Area Public Schools	$75,439	$78,557	$71,575
2905	Tri City United	$135,171	$147,035	$148,227
458	Truman Public Schools	$17,489	$16,595	$16,085
550	Underwood Public Schools	$40,616	$33,600	$39,104
640	Wabasso Public Schools	$32,251	$34,479	$36,131
113	Walker-Hackensack-Akeley Schools	$85,591	$94,747	$98,472
2143	Waterville-Elysian-Morristown Public Schools	$65,937	$64,071	$59,387
284	Wayzata Public Schools	$2,146,925	$2,187,598	$2,204,056
197	West St. Paul-Mendota Heights-Eagan Public Schools	$985,845	$1,024,557	$1,032,533
2898	Westbrook-Walnut Grove Public Schools	$40,103	$46,546	$45,546
624	White Bear Lake Public Schools	$989,093	$847,092	$919,560
347	Willmar Public Schools	$963,089	$980,337	$1,024,506

ISD No.	ISD Name	2019-2020	2020-2021	2021-2022
577	Willow River Public Schools	$7,988	$8,095	$7,765
177	Windom Area School District	$128,506	$139,557	$144,348
518	Worthington Public Schools	$863,600	$866,946	$860,938
2190	Yellow Medicine Public Schools	$96,497	$97,493	$99,119
2805	Zumbrota-Mazeppa Public Schools	$34,299	$38,405	$34,073

Source: MDE, 2023h, line 31.