

Moving White Educators from Culturally Responsive Theory to Practice

by

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At a diverse urban high school in Pittsburgh, PA, a nearly all-White teaching staff has struggled for years to improve culturally-responsive teaching practices. Despite attending hours of workshops, lectures and trainings on matters related to equity, social justice, culturally responsive pedagogy, and more, teachers generally reported an insignificant impact on actual practice. This research project attempted to close the gap between theory and practice, and train teachers to develop and implement culturally responsive lessons. Working with five White science educators, this study was structured around a series of in-depth professional development experiences focused on a) exploring Whiteness in society and in STEM, b) exploring scientific racial justice issues, c) studying high-quality culturally responsive social justice science curricula, and finally conceptualizing, creating, and implementing a culturally responsive science lesson. Despite some limitations particular to the relationship of the researcher to the participants, unique structure and autonomy of the school, findings suggest that White science educators are capable of making gains in their ability to understand and implement culturally science curriculum, provided their professional development is content-specific and practice-based. Further commentary addresses lack of effective teacher training, deep signs of concern about a shrinking and increasingly White teacher pipeline, and prioritizing content-specificity and practice-based professional development.

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Preface

Debates about education policy today take many forms and reflect a range of concerns about the myriad challenges facing this country’s communities, families, teachers, and students. For decades, the prolonged focus on the so-called “achievement gap” between White and non-White students has further entrenched the deep-seeded stereotype that Black and Brown students are “failing,” relative to their White counterparts (Allen, 2008). The re-segregation of many schools across the country has rolled-back some of the important yet slow, marginal, and inequitable educational gains made during the forced integration of the past half-century (Bell, 1976; Devoto & Renowski, 2017). “School choice” and the political struggle between traditional public schools and charter schools has captivated education debates at the local, state, and national level. Standardized testing and Common Core have become divisive political issues, as educators and parents struggle to decide just how much schools should have in common regarding curriculum and expectations for learning. Rampant school suspensions function as a pipeline for Black and Brown¹ students into the criminal justice system, contributing to their intended mass incarceration (Alexander, 2012). Mental health issues among students have skyrocketed in the past decade, leaving teachers and schools languishing without adequate social workers and support systems. The COVID-19 pandemic has interrupted educational systems, the effects of which are yet to be fully understood. And now a partisan political battlefield has emerged around the supposed application of critical race theory in American schools.

¹ African American and Latinx (Sensoy & DiAngelo, 2017).

This country's system of education was established with several primary objectives; to establish a connective tissue intended to bind citizens in a newly formed democratic society, to create infrastructure which provided a reliable labor force for America's rapidly changing industrial and agrarian economies, to "assimilate" European immigrants into American society, and create state and federal institutional relationships which could be used to further cohere a rapidly expanding society. However, because of the United States' explicitly White supremacist political and legal commitments during the antebellum and Jim Crow periods while the system of education developed, these stated objectives had the simultaneous effect of systematically excluding and subjugating people of color, particularly Black Americans (Tyack, 1974; Neem, 2017; Bartz, 2019). Throughout this painful history, White women were at the forefront of leading most of these White schools, Native American schools, and even eventually Black schools. These White women saw themselves, and were deployed by the state as, "surrogate mothers...who would properly train indigenous children for their roles in society;" roles which were expressly constrained by racist social, political, and economic norms and rules (Jacobs, 2006, p, 196). Thus the role of teaching for White women both conformed to sexist notions of women as mothers, but also allowed these Women to wield their White power against minoritized students. This pattern of White women leading classrooms at disproportionate rates remains part of our culture today where White women make up 75% of teachers in America's public schools (National Center for Education Statistics, 2021).

Against the backdrop of this history of educational injustice and the present issues which still beleaguer American schools, each day an increasingly White teacher workforce is facing an increasingly Black and Brown student body, and these White teachers are not adequately meeting the learning needs of their increasingly diverse students (Picower, 2009; Milner, 2010; Meckler &

Rabinowitz, 2019). This project hopes to illuminate how one group of White science teachers at City Charter High School works to better understand their roles as White educators in a diverse urban high school and improve their effectiveness with Black students through a series of professional development workshops on culturally responsive pedagogy.

1.0 Naming and Framing the Problem of Practice

1.1 Diverse Urban School, White Teachers, Pedagogy, and “Achievement”

Teachers’ racialized realities and cultural conditioning impact nearly every aspect of their practice. White teachers in urban schools often did not grow up in urban areas, attend urban schools, have significant exposure to diverse peer groups, or prepare to become educators in an urban context (Utt & Tochluk, 2020). This disconnect in context and experience is combined within the past and present racial positionality of White teachers as persons with power over students, and most centrally in urban schools, over students of color (Farinde-Wu, Alvarez & Allen-Handy, 2020). In addition to being a relationship where racial and other forms of social power are wielded against Black students, this disconnect significantly restricts White teachers’ ability to humanize, understand, and draw upon the experiences and rich histories of students with whom they do not share common backgrounds (Milner & Laughter, 2015).

According to Pew Research in 2015-16, fully 75% of teachers in America are White. Just under 50% of students are White in America’s public schools, which educate nearly 90% of American students (Geiger, 2018). In Pennsylvania, America’s fifth-most populous state, less than 6% of teachers are people of color, and the gap between the state’s 33% students of color and the 94% White teachers is the largest in the nation. And more than 60% of the state’s teachers of color practice in Philadelphia and Pittsburgh, meaning the state’s teachers of color are sparsely dispersed across the entire rest of this large geopolitical territory. (PA Dept. of Education, 2018).

This demographic mismatch matters, for as Carter G. Woodson pointed out nearly a century ago, the mechanics of educational inequality are enacted in classrooms primarily through

White culture, and the power to exclude Black students from the personally and socially transformative power of education. Past and present, White schools utterly fail to recognize Black children as having distinct cultures and instead chose to categorize them as deficient in every respect (Woodson, 1933/1998). This project argues that White teachers - even the most committed and well-meaning - have been positioned to repeat the same mistake of the schools Woodson so poignantly described nearly nine decades ago; the failure to develop a more sophisticated understanding of how race and culture impact teaching and learning is one of the factors which most limits the ability of White teachers to tap into the true potential of their Black students (Hammond, 2015).

Much of the scholarship and public concern about educational inequality across this country has been confined into a singular way of understanding these disparities. Contemporarily known as “the achievement gap,” the National Association for Educational Progress defines the phenomenon as “...when one group of students (e.g., students grouped by race/ethnicity, gender) outperforms another group and the difference in average scores for the two groups is statistically significant (2020). “The Nation’s Report Card,” as NAEP is commonly known, is a data clearinghouse on how different racial and ethnic categories of students perform on standardized tests, and this data is intended to inform educational practitioners and policymakers.

However, after years of inspecting these disparities within the walls of America’s schoolhouses, critical scholars and informed policymakers now suggest that the difference in performance between White students and Black and Brown students should principally be understood as an academic manifestation of structural racism (Merolla & Jackson, 2019) and accumulated disadvantage for marginalized students and accumulated advantage for White students (Pager & Shepherd, 2008). Because school performance outcomes are highly contingent

upon non-school factors and manifestations of injustice and segregation in society, some prominent educational researchers posit that the framing of “achievement gaps” ought to be recast as evidence of “educational debt,” a perspective that encourages educators to understand these disparities not as “performance” issues, but rather as evidence of the inherited and ongoing disparities in society and schools (Ladson Billings, 2006; Reardon, 2016).

Maintaining a narrow achievement gap frame can warp researchers and practitioners' sense of the nature of teaching and learning in schools which bear an achievement gap. Gutierrez (2009) challenged this framing in research and praxis with the useful moniker “gap gazing,” and concluded that merely capturing and monitoring racial disparities in performance data often does little more than tell us what we know about socioeconomic inequality, and can often reify deficit attitudes and approaches to marginalized populations. So while nearly all educational institutions deal in the fraught language of student performance, and while there may be some utility for maintaining this data as a superficial metric about schools (Lubienski, 2008), practitioners ought to exercise some caution and skepticism when seeking to deeply understand performance achievement gaps between student groups who often have widely varied socioeconomic and cultural backgrounds.

The specific causes of disparities in group performance are dynamic, contingent upon many other variables, and contextual across place and time. Academic outcomes for individuals and groups are also complex; and in light of these complications in understanding student performance at the group or even the individual level, focusing narrowly on disparities in academic performance is even more precarious - especially as it pertains to seeking to redress these educational concerns. This research project hopes to drop the traditional racial achievement gap framing, and by focusing

on the particular marginalization of its largest student group, direct teacher practices towards accelerating learning and engagement for Black students (Gutierrez, 2008).

1.2 Organizational System: Overview of Place of Practice

City Charter High School, locally known as “City High,” is an open enrollment school located in downtown Pittsburgh, Pennsylvania. Founded in 2002 as an open-enrollment, non-profit, full-inclusion, public charter high school, it serves students primarily (close to 80%) from Pittsburgh but also many students from adjacent communities like McKees Rocks, Homestead, Duquesne, Wilksburg, and more (City high.org, n.d.). The school’s founders, Dr. Richard Wertheimer and Mario Zinga, combined their decades of experience teaching in Pittsburgh high schools and sought to offer an alternative public high school which focused on teaching excellence, long-term relationships, and post-high school success (cityhigh.org). As it nears its 20th year of operation, it has many accomplishments about which to boast. Yet like many organizations that serve a diverse and unequal population, City High struggled to cultivate a more nuanced understanding of race and culture within its school community, and improve professional practice around methods now commonly understood as “culturally responsive pedagogy/practice.”

The school’s mission accurately describes the school, as “a technology infused public school is to graduate students who are academically, technologically, personally and socially prepared to succeed in post-secondary education, training, or employment...” (cityhigh.org). The school has no sports, but has academic, civic, and artistic extracurricular activities for students. Notably, City High is a “looping school,” which means that most faculty spend the entirety of the four-year high school experiencing, developing sustained relationships with students as

individuals. This is a critical structure to which most practitioners inside and experts outside of the school attribute a high degree of credit for the best aspects and outcomes of the school, as there is strong evidence that looping strengthens student learning and connection with the school community (Cistone & Shneyderman, 2004; Baran, 2010).

The school was also informally founded as a colorblind² institution, where elevating students out of poverty was seen as a unifying mission among professionals. This focus on socioeconomic status, well-intended as it was, created an environment where teachers and staff simply did not develop a discourse around racial dynamics impacting the students they served, nor their own work within the school. This color-evasive orientation made it much harder to interrogate some of the challenges the school would face, including some of the racially-conscious pedagogical changes proposed in this study.

1.3 Organizational System: Demographics at City High

At City High, there are about 550-600 students, 53% of whom self-identify as Black, 11% who self-identify as biracial/multiracial (mostly from White/Black families), and around 35% of whom self-identify as white. 59% of our students are economically disadvantaged (qualifying for free or reduced lunch based on family income) (A+ Schools, 2018, p. 120) yet upon looking more

² Henceforth this paper will substitute the traditional term “colorblind” with “color-evasive.” “Color-blindness, as a racial ideology, conflates lack of eyesight with lack of knowing. Said differently, the inherent ableism in this term equates blindness with ignorance. However, inability to see is not ignorance; in fact, blindness provides unique ways of understanding the world to which sighted people have no access. Blind people are knowers...(Annamma, S. A., Jackson, D. D., & Morrison, D., 2017)”

closely at the socioeconomic status of our students, we see the distinctly racialized nature of poverty in Pittsburgh.

Of the 296 Black students at City High, 80% of them qualify for free/reduced lunch. There are 67 multiracial/biracial students at City High, and 73% of them qualify for free/reduced lunch. Yet of the 195 white students at City High, only 42% of them qualify for free/reduced lunch. Of the 364 Black or biracial/multiracial students in our school, 78% of them are low income. Of the 195 white students, only 42% are low income. Students of color, mostly Black, are almost twice as likely to be low-income. While troubling, this data is not surprising. Black students at City High tend to be from lower-income communities, most of which are historically segregated (City High Annual Report, 2019). Median incomes across racial groups reflect this stratification, as median income for Black families in Pittsburgh is \$21,800, and for White families is \$44,600, and 33% of Black families in the city live in poverty compared to 14.9% of White families (Bangs & Davis, 2015). So the heavily racialized poverty rates among our students generally reflect those more generally in Pittsburgh.

1.4 Organizational System: Student Performance at City High

City High is a school known for its focus on academic rigor, emphasis on relationships, post-high school planning, and boasts higher graduation rates than any PPS school, including 91.4% of our Black students graduating compared with 75.9% in PPS and 72.1% statewide. Also, a higher rate of CCHS students are Pittsburgh Promise eligible (90% attendance and 2.5 grade point average) than any PPS school, yet here a disparity exists; 91% of white students are fully

eligible, while only 63% of black students are fully eligible, though the disparity more typically is closer to 20% between groups. (City High Annual Report, 2019).

City High experiences standardized test score outcomes analogous to virtually all schools who serve a racially diverse and socioeconomically varied student body. The following numbers reflect black students, multi-racial, and white students who are proficient or advanced, in literature (B-45%, MR-75%, and W-78%) in algebra (B-22%, MR-41%, and W-61%) and biology (32% black and 71% white). In terms of Black students meeting the ACT College Ready Benchmark compared with Black students nationally, City High students were found in 2020 to be four points behind in English (28% to 32%), three points ahead in Math (16% to 13%), one point ahead in Reading (21% to 20%), and four points behind in Science (7% to 11%). Here, the impact of racism is evident by how low Black students were normed as a subgroup, relative to the overall national average, with Black students national average being 28 points lower than the national average in English (32% to 60%), 27 points lower in Math (13% to 40%), 26 points lower in Reading (20% to 46%), and 25 points lower in Science (11% to 36%) (A+ Schools, 2018, p. 120).

QPA (quality point average) is another piece of the student performance profile of City High. QPA, like so much other academic data, reflects our city's inequities, and is generally correlated with levels of economic disadvantage across racial groups, though with some exceptions. Black female students, for example, record higher QPAs than other subgroups when controlled for their free or reduced lunch status. Attendance in school - where City High far outperforms our local counterparts - is often thought to be highly associated with student achievement as measured by QPA, yet Black males had the highest attendance and the lowest QPAs of any subgroup, and are also more likely to have a special education designation, and are less likely to have taken any honors course offerings.

This snapshot of City High’s academic data based on more static metrics shows a high-performing urban high school where Black students tend to achieve greater academic success than their other local schools while still reflecting the educational, social, and economic inequities which predate their enrollment at City High. However, also looking at student growth over time can also be a useful way to paint a fuller picture of student learning at City High, though here the data is less consistent and complete.

Over the years the school has assessed student growth using three primary analyses: First, the school utilized reporting through the states PVAAS system and subgroup growth targets. Second, the school uses STAR testing, which takes snapshots of student performance three times during the 9th grade year, and builds a growth profile projection. Third, the school used to use the “Value Add” tool which accompanied the ACT prep sequence (EXPLORE Test 9th, PLAN Test 10th, and ACT in 11th).

The first growth assessment is the only data set the school has which is disaggregated by race, which suggests an inadequate level of attention to how specific groups of students are growing academically. Using the PVAAS data from the 2017-2018 State Growth Expectations, the only subgroup analyzed (African American, Economically Disadvantaged, and Special Education) who did not meet or exceed growth projections in English, Math or Science, was African American students in Math, who interestingly exceeded projections in English and Science.

Every year for the past 15 years, nearly all students have taken a comprehensive survey on their experience at City High, they answer the following questions about teaching and learning among many others: “Notice if I have trouble learning something, give me specific suggestions about how I can improve my work, are easy to talk with, understand my problems, listen to

students' ideas, treat me with respect.” Students across all races and genders report very high perceptions of their teachers. They then rate the school based on the following core values: “Safe environment, caring environment, connected to the real world, students take responsibility for their own learning, collaboration and teamwork, challenging every student to grow academically, every student makes connections with adults and is known as an individual.” Here again, students report that City High lives up to these values, with virtually no difference across demographic groups.

Students have for the last five years also been asked a series of questions related to equitable treatment at City High. According to the students themselves, “students are treated equally well irrespective of gender, “ all students are treated the same regardless of whether their parents are rich or poor,” “this school provides instructional materials that reflect my cultural background, ethnicity, and identity,” “adults working at this school treat all students respectfully,” “people of different cultural backgrounds, races, or ethnicities get along well at this school,” “when it comes to discipline, students are treated equally regardless of their race, gender, or identity,” and “teachers here have the same high academic expectations for students regardless of race, gender, or identity, teachers here understand my background and community.” For each of these questions, students report favorable experiences – with only increasing favorable responses over the four years - with virtually no difference across demographic groups (City Charter High School Annual Report, 2019).

While students overwhelmingly rate the school favorably, it still has work to do with respect to school discipline. In the University of Pittsburgh’s sweeping 2018 study of the school-to-prison-pipeline in the region, City High was identified as having a suspension rate (41 per 100) four times the state average, and three times the county average, and seven points higher than Pittsburgh Public Schools. While this does not negate the positive perceptions of students’

experiences in the school, it certainly complicates the school's view of itself as a healthy learning environment for students. Curiously, but perhaps consistent with student perceptions of fairness across demographic groups, City High's racial disparity was lower than in PPS, Allegheny County, and the state. In fact, the report states explicitly, "[City High's] net results present an unusual trend of increasing suspensions for all, but with narrowed disparities...there should be strong attention to disciplinary approaches overall" (Huguley, J., Keane, G., Koury, A., Monahan, K., Monahan, K., Wang, M., 2018, p.21). This report spurred immediate action on the part of school leadership, which began reviewing and changing disciplinary procedures at every level of infraction.

City High's curriculum is unique from most local schools in that it is rich in interdisciplinary courses and teachers have a high degree of autonomy over their work. Literature and history are fused for three full years before splitting into more specific disciplines during senior year. Math and science are regularly blended at various times throughout the four-year loop, and technology and financial literacy are taught in a fully collaborative environment for three full years. Information Literacy is a research and library sciences course that culminates in a student-driven research project junior and senior year. Students take career classes for three years, which focus on post-high school planning. The school has a rich elective program, whereby students can partake in a range of history, literature, writing, music, art, science, math, coding, fitness, and more. Teachers work within their departments to innovate with course content and teaching methodology, and collaborate with the school's Education Manager on significant programmatic overhauls.

Over the years, the only department which has intentionally focused on ensuring course content is culturally responsive, focused on racial justice, and centering marginalized voices has been "Cultural Literacy," (literature/history). This commitment is reflected in all department

documents and rubrics related to curriculum, and in the department's role in leading equity work in the school throughout the years. The course is deeply critical of power, focused on dynamic studies of literature from mostly marginalized authors, media literacy, and a powerful space for students to explore their identities and larger questions of justice, democracy, and human rights.

Individual teachers in other departments pursue these modes of practice as well, but no departments have such an explicitly formalized practice to this end. For example, two math teachers are currently working with a scholar at the University of Pittsburgh on bringing culturally responsive social justice content into the math program, but this is the first time this work has taken place in the math department, and no other departments have established this type of rigorous self-examination and solidified study or practice around these issues. So while departments have wide berth to innovate this has generally not translated into an exploration of culturally responsive curricula which centers, or even addresses, the Black experience across multiple disciplines; the reasons for which will be explored in this project.

1.5 Organizational System: Equity Work at City High

For the past five years at least, City High has provided at minimum four mandatory staff-wide workshops (some multi-session) on race and equity issues, including at least a dozen smaller workshops on race and racism, culturally responsive pedagogy, Reality Pedagogy, Asset Theory, data on inequities facing our students, Restorative Justice, LGBTQ students, trauma-informed practices, and many more, occurring both with whole grade-levels of staff and voluntarily. The vast majority of the nearly 100 staff members have attended several "CUE Talks" (lectures given at the University of Pittsburgh's Center for Urban Education) and for years have attended CUESEF

(Center for Urban Education Summer Educator Forum). The school has formally adopted an Equity Policy, articulating its commitment to equitable practices at every level of the organization, and very recently added some equitable teacher practices to the promotion rubric (Appendix B).

Yet despite these initiatives, including most recently in the 2019-2020 school year, another school-wide series of multiple culturally responsive pedagogy workshops which were interrupted by the pandemic, teachers and departments have struggled to incorporate these practices into their instructional programming outside of the few teachers who already strive to adhere to this pedagogical framework. This project will seek to explore why, if there has been interest and engagement for staff regarding the work of exploring these complex issues, it has been so difficult for the accumulated knowledge of these trainings to translate into classroom practice.

City High has solidified its commitment to equity through the Middle States Accreditation, during which the school establishes 7-year strategic planning objectives, which are broken down into detailed and specific timelines, processes, and measurements. After years of race and equity workshops and conversations which ultimately contributed to greater school-wide attention on equity issues, the school's leadership team made "Equity" one of the school's three 7-year strategic objective categories. This means that at the organizational level, the school is formally committing to establishing long-term changes in programming and structure to promote equity and will be held accountable by the state, to whom it will present the plan, objectives, and metrics. Based on the school's ability to demonstrate effort and progress, it will receive a renewed state accreditation, so the stakes actually are high, not just for the experiences and outcomes of students but for the school itself.

1.6 Organizational System: Positionality Statement

As a White man who is cisgender, heterosexual, born to middle class educated parents, and able-bodied, I have lived my life with the unearned social, political, and economic advantages in a society which privileges these combinations of identities. At the same time, I grew up being Jewish, a religious and ethnic minority in a nearly all-white, Christian, working class town in the Midwest. It was my experiences as a Jewish person in small-town America which most predisposed me to become interested in questions of equity and justice, and cultivated in me both the emotional sensitivity and the intellectual curiosity about the nature of these issues. That said, as a person, educator, scholar, and citizen, I understand that my identities may at times distort or limit my understanding of the world and I strive to maintain rigorous commitments to the pursuit of truth and justice by constantly engaging the perspectives of people with whom I do not share identities, especially marginalized people.

My role at City High, where I am completing my tenth year, is two-fold. First, I teach 11th and 12th grade social studies elective classes and design new programs and courses for the department. Second, I am an “Educational Leader,” which means I ascended through the performance-based promotion process and am now a member of the school’s “Leadership Team,” which is composed of the school’s administration and around 10 other Educational Leaders which meets weekly. In this informal leadership role, I contribute to broader school initiatives, support staff development, and work on a range of other non-teaching tasks. Most importantly, my role on the Leadership Team affords me opportunities to collaborate with and mentor teachers throughout the school.

1.7 Statement of the Problem of Practice: White teachers struggle to create and implement culturally responsive pedagogy.

Carter G. Woodson’s point about the failure to “recognize Black children as having distinct culture” is accurate, and generally true at City High. City High’s teaching staff is 95% White, and our students are nearly 70% Black or multiracial. Most of the Black professionals in the building are administrators or part of the school’s non-teaching staff – serving vital roles, but not primarily focused on classroom instruction. Most of the staff grew up in suburban or rural areas. For many of them, City High is the first urban school in which they have ever worked, and they lack the specific professional training on how to engage students across culture, race, geography, socioeconomic status. As the extensive data from students suggests, teachers do an impressive job recognizing and caring for each student as an individual, yet as previously discussed, the school’s mostly-White teaching staff has struggled to intentionally leverage the dominant culture of the broader student body, who are Black, in instructional practices and curriculum development. So the fact remains that many teachers continue to self-report not fully understanding how to apply the equity-oriented theories they have been exposed to through numerous professional developments; for example, being hesitant to create or implement culturally responsive pedagogy in their classrooms.

Empathy interviews conducted with five highly-respected educators across disciplines throughout the school communicate a range of perspectives on this general reluctance to embrace and implement culturally responsive pedagogy. While none of the teachers expressed personal reluctance to explore race and racism in their practice and have in fact, attended many anti-racist and equity trainings over the years, teachers regularly referenced the school’s orientation as a color-evasive organization as a powerful norm which for the first decade of the school made

discussions of race and cultural difference between staff and students difficult to have. Though much progress has been made in the past decade with respect to the school's ability to acknowledge its limited ability to think seriously about racial dynamics, and long-term equity commitments from the Board of Directors to the classroom teachers have been developed, this color-evasive foundational norm fostered an underdeveloped language with which to describe and analyze race in the context of this urban school.

They also referenced their own lack of preparation in teacher training programs to understand and engage student culture and context in a meaningful way through planning and teaching. Most of them discussed the overwhelming number of White colleagues who also shared a similar background and lack of training on these pedagogies which made it an even more unlikely that they would explore these dynamics as they began their careers here years ago. These practitioners had their training and most formative years of practice in a context where understanding race and culture were not prioritized.

This group noted contrasting feelings of gratitude for the school leadership which has signaled a shift towards a stronger equity focus in practice, and also the frustrated sense among staff that they do not even know where to begin. Notably, every single one of these teachers expressed enthusiasm about the possibility that their practices could grow more equitable and culturally responsive, and communicated a similar eagerness among most of their department colleagues. Based on these interviews and years of close collaboration with nearly all staff at City High, this project will generally assume that teachers at City High are interested in exploring race and culture - and want to understand, create, and implement culturally responsive pedagogy - they just do not know how at the level of curriculum development and classroom instruction.

This failure to implement culturally responsive pedagogy matters, and serves to constrain the growth and performance of our Black student population for as established in a review of more than 2,800 studies, culturally responsive practices improve academic experiences and outcomes for marginalized students in American classrooms (Hanley & Noblit, 2009). If the school wishes to accelerate Black student learning, then it must help White teachers understand their Whiteness, understand and leverage Black student culture and context using this framework, and thus further empower these students to tap into their own intelligence and potential in ways they have yet to encounter in most high school classrooms.

This approach shifts the focus from assuming Black students are deficient academically in some way compared to their White peers, or fundamentally inhibited by poverty, and instead assumes that there are racialized cultural differences which, once explored and utilized, may remove barriers to Black students' ability to more deeply learn and engage within the classrooms of the school. Failing to see Black students as having distinct culture is not only a question of justice for students who face myriad forms of injustice in our society, it is a massive opportunity cost with respect to the amount of energy and potential which may lie unexpressed and unrealized for Black students in their academic performance as learners at City High.

2.0 Review of Supporting Knowledge

2.1 Impact of Racism in Pittsburgh

Acknowledging the oppressive ideological context in which America's school system was established, fundamental critiques can and must be made at every level and time throughout our history with respect to education's philosophical commitments to Whiteness, American nationalism, capitalism, and Euro-centricity generally (Springer, 2013; Bartz, 2019). School systems and school curricula have and can still be used to uphold the social, economic, and political status quo which had been previously erected through hundreds of years of enslavement and settler colonial violence.

There should be no doubt that "race matters" in the context of urban schools, and as in the study of any singular school, it is necessary to understand the students and teachers in this study within the context of this particular mid-size city, Pittsburgh, because "outside of school matters," and the material and social conditions which act upon a school and its students must be understood as essential background for any research (West, 1993; Milner, Murray, Farinde, Delale-O'Connor, 2015). Pittsburgh is among the least livable in the nation for black men with respect to cardiovascular health, cancer, homicide rates, child poverty, and occupational segregation. It is also among the least livable for black women with respect to fetal death, deaths during birth and pregnancy, cancer, cardiovascular health, poverty, child poverty, out of workforce rates, and more. (Howell, Goodkind, Jacob, Branson, and Miller, 2019.) In 2015 the median household income for Black families was \$21,800 in Pittsburgh, compared with \$35,600 for Black families nationally.

The rate of black poverty in Pittsburgh (33%), Allegheny County (30%), and the greater metropolitan area (30%) are all higher than the national average for black poverty (24.2%).

Racial inequality in Pittsburgh permeates many other metrics as well, including marital rates, percent of people working in management or service jobs, reliance on public transportation, perception of opportunity, relationships and contact with law enforcement, a range of physical and mental health issues, and other significant socioeconomic indicators. (Bangs & Davis, 2015). Pittsburgh also features one of the smallest non-White professional classes in the nation, and one of the lowest workforces participation rates for Black workers across 15 comparable cities studied. This entrenched stratification and exclusion carries implications not just for the city's civic culture and landscape of opportunity today, but as a signal for investment and the ability to recruit and retain professionals of color (Fraser, 2015).

These inequalities, stratified so strongly by race and class, are consistent with the historical patterns in Pittsburgh throughout the past century, and thus are not merely contemporary problems. As historian Joe Trotter noted when describing life in Pittsburgh for Black refugees from the South during the Great Migrations of WWI and WWII:

The color line in the workplace encouraged and was in-turn encouraged by racial discrimination in the larger residential, institutional, and community life of the city. Virtually every institution serving the public discriminated against Blacks in some fashion. Public accommodations and commercial establishments - restaurants, theatres, swimming pools, stores, skating rinks, to name a few - either excluded African Americans from service altogether or offered provisions on a segregated basis”(2010, p. 12-14).

Today Pittsburgh's schools remain so racially segregated that the typical white student in PPS attended a school that was nearly 90% white and 29% were low-income, the typical black student attended a school that was nearly 50% black and 69% were low-income (Bangs and Davis, 2015) This segregation is consequential because skin color is "systematically linked to other forms of inequality," and strongly linked to dropout rates, student achievement, exposure to quality of teachers (2015, p. 5). Research has shown that segregation itself has a depressive effect on student achievement (Vivian, 2017; Owens, 2018).

In 2018, scholars from the University of Pittsburgh provided a comprehensive review of Allegheny country's problem of exclusionary discipline in schools. This study elucidates the highly racialized nature of this problem, with Black students are also three times more likely to be suspended than white students in Pittsburgh and seven times more likely to be suspended across Allegheny County (Huguley, et al, 2018). Perhaps unsurprisingly in this context of systemic racial inequality in the city, Black students are educated in the most destabilized schools and are the lowest performing demographic in the city academically with regard to reading and math scores and educational attainment. Here again, racial inequality between Black and White citizens runs through many relevant metrics with respect to student achievement; percent of adults with high school diploma, proficiency in math by 4th and 8th grade, access to private schools, adults with college degrees, and more (Bangs and Davis, 2015).

2.2 Socioeconomic Conditions and Educational Experiences Suppress Learning

Researchers have long understood poverty as a critical variable impacting students' academic achievement, yet school reform efforts narrowly focused on issues confined to the

schoolhouse tend to discount the role of profound socioeconomic dynamics which act upon students before and while they are in their classrooms. Students who live in poverty “can experience several disheartening realities: housing instability; hunger; health and nutrition problems; school instability; physical, emotional, and psychological abuse due to stress; family instability,” all of which have significant impact on educational outcomes (Milner, Murray, Farinde, Delale-O’Connor, 2015). “Our neighborhoods are highly segregated by social class, and thus, also segregated by race and ethnicity. So all educational efforts that focus on classrooms...could be reversed by family, could be negated by neighborhoods, and might well be subverted or minimized by what happens to children outside of school” (Berliner, 2006, p. 951). And the framing matters, not just in having compassion for the violence of poverty on children, but for focusing efforts on how to mitigate the inequities of American education.

By centering socioeconomic conditions over classroom conditions, policymakers can recalibrate their approach to improving academic achievement, for student achievement is severely impacted by poverty. Some modeling suggests that arguably the strongest correlation between student achievement on fourth and eighth grade math and science scores is the percentage of students living in poverty within the school, though since poverty is more heavily concentrated in Black, Latinx, and American Indian communities, this racial concentration warrants special attention (Berliner, 2006).

The effect of poverty does not only constrain students by reducing access, quality, and opportunities in schools, it does physical violence to young minds. Poverty and sustained deprivation from adequate security and resources, which is highly racialized in America, can actually prevent the genes involved in academic intelligence from expressing themselves in children and may have a negative effect on the ways children develop intelligence in their most

formative years of life (Turkheimer, Waldron, Haley, 2003). Scientists have learned that poverty not only impinges upon gene expression, but also hinders physical development in parts of the brain associated with cognitive and academic achievement (Hair, Hanson, Wolfe, & Pollak, 2015).

Environmental factors associated with poverty impact child development in fundamental ways. Low-income children who are disproportionately Black and Brown, are exposed to higher levels of lead in their earliest years of life, which is associated with decreased reading ability and correlated with parental educational attainment as well as socioeconomic status. According to researchers, “given the higher average lead exposure experienced by African American children in the United States, lead does in fact explain part of the achievement gap” (Miranda, Kim, Reiter, Overstreet, Galeano, & Maxson, 2009, p. 1019). Racialized poverty harms children’s minds and bodies, which contributes to the so-called racial achievement gap, though it often goes unacknowledged in public discourse.

And in addition to the impact of poverty and the litany of other inequities experienced by many low-income Black families within the United States across the economy, health care, education, and more, the impact of trauma - highly associated with concentrated, racialized, poverty - on child development is well understood to be a range of negative educational and mental health indicators in children. Witnessing and experiencing violence in one’s community is highly associated with decreased academic engagement and increased behavioral problems, and students’ exposure to “vicarious racism” within their early lives is correlated with a range of socioemotional and mental health issues, all of which impact school performance (Thompson & Massat, 2005; Heard-Garris, Cale, Camaj, Hamati, & Dominguez, 2018).

Across America, scholars have detailed the excessive application of suspension, expulsion and arrest of Latinx, Native American, but especially Black students in American education, and

that “suspended students were three grade levels behind their non-suspended peers in their reading skills, but were almost 5 years behind 2 years later” (Gregory, Russell, & Noguera, 2014, p. 60), and concluded that school suspension has repeatedly been found to be a moderate or strong predictor of the risk of dropout or delayed completion. Suspension also erodes the connection between students and school, thereby diminishing the “bonds” which are well understood to reduce negative outcomes such as delinquency (Hawkins, Smith, & Catalano, 2004). And as these practices are meted out in a racially disparate manner, then by definition they contribute to the achievement gap.

Student achievement is also impacted by teacher expectations and perceptions of students at the level of instruction. Teachers teach more effectively to students they perceive and expect to be stronger and in turn, students perceive teachers' cues about those expectations (McKown & Weinstein, 2008). Perceptions of discrimination have also been negatively associated with intellectual curiosity and academic persistence (Leath, Mathews, Harrison, & Chavous, 2019). Scholars such as Spencer, Steele, and Quinn (1999) and other scholars like Delpit (2012) argue that students may perceive a “stereotype threat,” or the fear of being judged not as an individual but as confirmation of a group’s negative stereotype, which may activate a form of negative expectancy on the part of teachers and affects student performance.

Perhaps unsurprisingly, marginalized students’ sense of belonging, which can be understood as a state of “sensitiv[ity] to information diagnostic of the quality of their social connections,” and a wide variety of prior scholarship suggest that social connectedness is important to intellectual growth and academic achievement, through factors like motivation, confidence, and sense of confidence in their belonging in a learning community (Walton & Cohen, 2007, p. 82).

One of many factors which can positively impact Black student advancement and performance is close contact with Black teachers, and in fact, even a single Black teacher can make a significant impact as Black students are less likely to be subjected to exclusionary discipline within classrooms led by Black teachers, thereby potentially shielding them from some of the toxic effects of suspensions and expulsions so common in schools led by mostly-White educators (Lindsay & Cassandra, 2017). Equity-minded policymakers ought to direct energy towards increasing the racial and cultural familiarity between students and staff, thereby ameliorating some of these disparities and working towards a more just system of education.

2.3 Critical Whiteness Studies

Since culturally responsive pedagogy often deals directly with the racial and cultural dissonance between White teachers and Black students, interrogating Whiteness as an operational concept among White teachers is necessary. Critical Race scholars throughout the past 30 years have deepened educators' ability to understand and engage issues of race at both the micro and macro level, by arguing for several core assumptions in social analysis; racism is widespread and often overlooked, racism is permanently entrenched in aspects of culture and institutions, and that racism must be confronted (Crenshaw, Gotanda, Peller, & Thomas, 1995; Ladson-Billings, 1995)

Out of this field of scholarship emerged a subfield, known as Critical Whiteness Studies, and these scholars tend to share a common understanding of the world particularly with respect to the nature and extent of racism in the U.S (Jupp, Berry, & Lensmire, 2016). As noted by Du Bois more than a century ago, Whiteness is a social and psychological construct reinforced by material

and institutional power and must be understood as a position of power in a social landscape largely historically defined by race (Du Bois, 1903/1989).

The academic discipline of critical Whiteness with respect to education, is focused on the manifestation of Whiteness in teacher practice, particularly focused on privilege, race-evasive behavior, and White normativity within knowledge and institutions. Critical Whiteness Studies frames Whiteness not as an identity category but as a position of power which is intrinsically inseparable from the social, political, and economic violence inflicted upon Native Americans and enslaved Africans during the formation of this country (Matias, 2013; Springer, 2013; Lynch, 2018;).

Whiteness is a social construct built out of generations of White supremacist ideology and well-meaning, motivated, caring, White teachers can still engage in acts of racial aggression if they lack basic understanding of impact their own racialization has had on their own identity. This analysis of education argues that one of the primary ways White educators can establish a firmly antiracist practice is to understand attitudes about Whiteness and interrogate the role it has played in their personal identity, professional training, teaching pedagogy, and classroom practice (Mathias, 2013). White teachers can make the conscious choice not to enact or maintain the norms of Whiteness in their practice, thereby working against racial bias in their lives and classrooms (Johnson, 2002; DiAngelo, 2010).

This deeper recognition of race and racism for White teachers is an important departure from color-evasive ideology, which flattens eliminates White teachers' abilities to develop critical self-awareness in all of the aforementioned aspects of their pedagogy and practice. Color-evasiveness, as a pedagogical foundation for teaching, renders practitioners less able to notice and counteract their own power, identities, biases, and racialized enculturation, but also important

aspects of their students' lives, cultures, and truth-claims about their racialized experiences in the world (Johnson, 2002; Bonilla-Silva, 2003; Milner, 2006). White teachers who remain uninterested or resistant to exploring these dynamics can unintentionally replicate and perpetuate the structurally racist inequalities so characteristic of American educational institutions (Vaught, & Castagno, 2008; Picower, 2009).

2.4 Culturally Responsive Pedagogy

This vast tapestry of historical and contemporary discrimination in society and education, as well as the racial and cultural dynamics which impact teacher practice, demand that educators grapple with a difficult question: In the limited time teachers face students in their classrooms, what should they actually do in their quest to equitably educate their students? Culturally responsive pedagogy is one possible response to that question. This approach to teaching is a response to invisibility and outright racism faced by Black students schools, and draws upon the knowledge traditions and praxis which have long been a hallmark of Black educators dating back centuries (James-Galloway, & Harris, 2021).

Racial and cultural ignorance on the part of White teachers can make learning more difficult for Black students. Some scholars have explored the notion that this combination has led to Black students dis-identifying with schools generally, or even that school norms define academic achievement so narrowly as to force Black students to suppress their Black racial and cultural identities so as to attain success in this context – an educational iteration of the phrase “acting White.” These failures of the educational system to create conditions in schools which, contrary to White American cultural at large, are compatible with positive identity formation for

Black students, is a form of racial and cultural oppression which makes Black student advancement even more difficult (Akua, King, & Russell, 2013)

The academic origins of what would come to be known as culturally responsive pedagogy can be traced to the multicultural movement of the 1970s (Fullinwider, 1991). This movement emerged as a pedagogical approach meant to address the changing world in the wake of the Civil Rights Movement and in the midst of the Women's Liberation Movement and generally speaking, was an attempt to foster a more inclusive and diverse approach to curricula and instruction by making educators and educational organizations more sensitive to different cultural, racial, and ethnic perspectives (Mayfield & Garrison-Wade, 2015).

Yet as critical scholars like Ladson-Billings and Gay came to note, the multicultural movement fundamentally lacked a power analysis and had the effect of rendering invisible the specific marginalization of particular groups of people – notably Black and indigenous communities (Ladson-Billings, 1994; Gay, 2001). These and other critical scholars understood the set of practices and analyses which would come to be known as culturally responsive pedagogy to be an evolution of multicultural education, grounded in resistance to the corrosive impact of racism in America, which, in pursuit of equity and justice for marginalized students, went beyond the mere acknowledgement of different cultures.

In her early attempts to define culturally responsive pedagogy, Ladson-Billings identifies three foundational criteria; “an ability to develop students academically, a willingness to nurture and support cultural competence, and the development of a socio-political or critical consciousness” (1994, p. 483). In culturally responsive teaching, student culture and students' lives become central, and that the classroom become a community where students engage in critical inquiry with respect to social injustice and empowerment – challenging Eurocentrism and

deficit-approaches to student learning (Gay, 2002; Howard, 2010; Milner, 2016). Student culture, heavily associated with their racial positionality in the American landscape, becomes a reservoir of possibility for educators rather than a barrier to their learning.

Yosso's (2005) work on community cultural wealth categorized aspects of cultural wealth which minoritized students possess, which are often totally unrecognized by the educators who meet students on a daily basis. This framework provides a powerful language with which to describe the cultural assets which, unless properly understood, are often misinterpreted by educators from different racial and cultural backgrounds. Paris (2012) continued the evolution of this field by building a framework known as Culturally Sustaining Pedagogy, which recognizes the need for educators to not only draw upon and leverage student culture, but to proactively work to preserve and even expand the relevance of and prevalence of said culture.

Culturally responsive teaching has a measurably positive impact on student learning. Hanley and Noblit (2009) reviewed more than 2,800 studies on the effectiveness of this mode of practice, concluding that it clearly effected on students in a number of ways; most significantly with respect to positive racial identity, academic resilience, and improving student performance across a range of metrics. Beyond traditional academic metrics, King, Akua, and Russell (2013) explain some of the inner-experiences of Black students and the impact of educational inequality and cultural exclusion on identity development, motivation, and "cultural wellbeing." "High eurocentricity" is associated with low achievement and "proactive Afrocentricity" was associated with higher achievement, and positive racial socialization supports students' academic and social development, and that cultural supports in the classroom have a positive impact on students academically. Howard (2001) found that students connected with many of the values and evidence

outlined by aforementioned scholars and felt comfortable, validated, and reported lower cultural dislocation between their home environments and the classroom.

A central component of making students' lives the focus of teaching and learning using culturally responsive pedagogy is centering social justice issues in course curricula. Sometimes defined as "addressing economic, social, political, environment, and equity issues in education...connected to ethnicity, race, class, gender, age ability, orientation, and culture...[promoting] an understanding of critical consciousness and civic engagement" (Hutchinson and White, 2020). Culturally responsive social justice pedagogy focused on building students' sociopolitical consciousness by exploring the challenges they are facing in their communities, thereby explicitly anchoring student learning to awareness and activism in ways that matter to them.

Despite evidence-based, pedagogical arguments supporting culturally responsive pedagogy as a sound practice, it remains fairly obscure, and even marginalized (Sleeter, 2012). While this may be the case nationally, it fairly describes the state of culturally responsive pedagogy at City Charter High School (see context review), where most or all of the core tenets are practiced only in a handful of isolated spaces.

2.5 Culturally Responsive Pedagogy Professional Development, "Diversity, Equity, Inclusion" Trainings

There are several reasons that White teachers in this and other schools may struggle to embrace and implement instructional strategies which center their Black students. Possible reasons include first, teacher preparation programs tend to be White normative; centering the

values, knowledge traditions, assumptions about power, and additional cultural content which has been used to oppress Black people throughout our history (Sleeter, K., 2001). Another possibility is that these White teachers have not sufficiently explored the implications of their own White racial identity (Solomona, Portelli, Daniel, & Campbell, 2005). They may “simply think of themselves as being part of the racial norm and take this for granted without conscious consideration of their White privilege” (Tatum, 1994, p. 94). Another possibility is that these White practitioners, by dint of their own background as White in a highly segregated society, lack an understanding of Black culture, Black knowledge traditions, and the socio-cultural dynamics characteristic of their Black students’ communities, thereby inhibiting their ability to create instructional experiences which draw upon these ways of knowing and learning about the world (Ladson-Billings, 1994; Yosso, 2005; Milner, 2010). Lastly, as most of these teachers have been trained in mainstream teacher preparation programs during an era of vast testing and standardization, it may be that these practitioners lack fundamental training in culturally responsive curriculum development and instruction in favor of test-prep training (Sleeter, 2010).

Therefore a critical question lies in how a school can help White teachers professionally develop in ways that help them understand their identities, better understand their students’ identities, and change their instructional behaviors through culturally responsive classroom practice and curriculum development. Practitioners have reason to be skeptical that an intervention which may have worked in one setting would work in theirs, as there is little research consensus on which methods of professional development work most effectively and are generalizable (Bottiani, Larson, Debnam, Bischoff, & Bradshaw, 2018). Researchers tend to agree that training pre-service teachers to explore power, privilege, perspective, bias, color, culture, during their most formative and supported years is the optimal window of time through which to reach people who

may have the capacity to grow in the requisite areas needed to become culturally responsive in America's increasingly diverse classrooms (Milner, 2012; Lewis, Sayman, Carrero, Gibbon, Zolkoski & Lusk, 2017).

Matias and Mackey (2015) and Milner (2016), found that cultural/racial awareness coupled with critical reflection about theory and practice must be part of preservice teacher training if educators are to be grounded in culturally responsive pedagogy before they enter their respective places of practice. Milner also found strong impact of these formative educational experiences with later application of culturally responsive pedagogy, suggesting that teacher education programs are optimal times to cultivate these skill sets. One study found that school-embedded development programs effectively help teachers develop a more nuanced view of poverty and have a better understanding of cultural differences in their classrooms and another study found that after eight two-hour workshops on culturally responsive pedagogy, teachers' attitudes were impacted to a small or moderate degree with respect to a range of critical topics such as the impact of racism on students and historical or contemporary racial inequality (Casey, 2013; Mette, Nieuwenhuizen, & Hvidston, 2016). In other settings and workshops focused on culturally responsive pedagogy, teachers rated their understanding of and priority towards this mode of practice more highly than they did before engaging in the training and most participants had also indicated that the workshop changed the way they thought about and understood culturally responsive teaching (McKoy, MacLeod, Walter, & Nolker, 2017).

Studies have also shown that this type of training must be ongoing, sustainably supported, and not comprised of singular, sporadic trainings. Prolonged engagement in theory with a focus on impacting classroom practice is one possible way to impact teachers' ability to understand their own racialized identity and impact their teaching (Delano-Oriaran & Meidl, 2013). Several

additional variables impact how teachers respond to professional development on culturally responsive pedagogy, such as multicultural intelligence, levels of empathy, reflectiveness about their own attitudes, and being intellectually curious about culture as a part of human life (Rychly & Graves, 2012). Also, prior teacher perceptions of culturally responsive practices as a set of practices impact the effectiveness of professional development on these methodologies (Kavel, 2017).

At the school level, leadership has a powerful impact on teacher perceptions of and implementation of culturally responsive practices. Across a series of schools that were successfully and consistently closing the achievement gap, the administrative teams were fully committed to ongoing dialogue about race, culture, and school dynamics (Mayfield & Garrison-Wade, 2015). These culturally responsive school leaders had a firm intellectual understanding of race as a construct and racism as a problem, had a highly participatory parent engagement strategy built upon the cultural norms of the community, a robust culturally responsive environment in the building, culturally responsive teaching and learning practices, and culturally responsive student management, and engaged in ongoing, serious, professional development around culturally responsive pedagogy (Khalifa, Gooden, & Davis, 2016).

When discussing specific training methods, it is important to distinguish between specific interventions such as training series on culturally responsive or social justice pedagogy, with other more general experiences which purport to be in pursuit of similar objectives - equity, inclusion, reducing prejudice, etc. Recent years have seen the explosion of the multi-billion dollar DEI (diversity, equity, inclusion) industry, which is populated with organizations that consult with organizations across every domain, from elementary schools to corporate boardrooms in Silicon Valley. Actual experiences of the participants can vary widely, but generally these groups train

and educate the constituents of an organization on diversity, bias, inclusion, equity, anti-racism, and Whiteness. (Carter, Onyeador, & Lewis, 2020)

Many researchers remain fairly pessimistic about the limited benefits - and potentially negative effects - of such trainings. A review of nearly 1000 “anti-bias” interventions found very little evidence that any of these experiments in diversity training “spoke convincingly to the questions of whether, why, and under what conditions a given type of intervention works” suggesting that the any success of these interventions could have less to do with the interventions and more to do with preexisting dynamics within an organization (Paluck, & Green, 2009, p. 339). Some reasons why many so-called “diversity trainings” are predisposed to failure could be that short-term training interventions do not have the depth to change people, could potentially activate stereotypes, foster an inflated sense of the strength of organizational policies to reduce discrimination, often leave participants alienated, and demonstrate a tendency to resist any attempt to constrain their behavior or preferences (Dobbin, and Kalev, 2018). It is also likely that efforts to correct cultural or political misperceptions may also produce a “backfire effect,” when corrections actually intensify falsely held views among the group in question (Nyhan & Reifler, 2008). This project hopes to leverage several variables which may contribute to a more constructive experience for the participants involved; long-standing professional relationships and trust between colleagues, equity-focused direction of the organization as a whole, unified and supportive leadership from the school’s administration, and a strong desire on the part of the participants to strengthen their craft for the benefit of their Black students.

2.6 Summary of Literature

This literature review was completed in pursuit of several objectives. First, to establish some historical context for racial inequality across education, and describe inequality in Pittsburgh. Second, to explain how these conditions contribute to disparities in educational outcomes. Third, to discuss and critique the achievement frame as it relates to gaps between the academic performances of student demographic groups. Fourth, to explain the intellectual lineage, core philosophical principles, and effectiveness of culturally responsive pedagogy. Fifth, to interrogate Whiteness as a dimension of education in America which requires rigorous exploration as it relates to classroom instruction. Lastly, to explore the varied effectiveness of professional development related to these practices in schools and trainings on diversity, race, and equitable practices more generally. Culturally responsive pedagogy remains an uncommon pedagogical foundation in teachers. And while rigorous research suggesting ways to help teachers become more culturally responsive is varied and highly contextual, this project hopes to carefully explore ways these practices and approaches to all aspects of school life can be trained and implemented in the interest of pursuing equitable growth outcomes for students.

3.0 Theory of Improvement

3.1 Overview

City High has a diverse student body and a nearly all-White teaching faculty. As previously mentioned, most of our students are economically disadvantaged, and 53% of our students self-identify as Black, 11% self-identify as biracial/multiracial (nearly all White/Black) , and around 35% self-identify as white. As a school that prides itself on academic rigor, Black students at City High outperform their peers in virtually every generally measured category of learning. As a school that prides itself on authentic relationships, City High has proven itself as a school which treats students respectfully and educating them as individuals, as student and parent survey data indicate high ratings on student experiences and equitable treatment. This progress is significant and ought to be lauded and preserved.

Yet despite this vibrant and diverse culture, the school has never attempted to systematically focus on Black student achievement and academic performance. For many practitioners, as stated in empathy interviews, the prevailing logic has suggested that since Black student performance is consistently higher at City High than our local and state counterparts, then no sustained focus on Black student performance is warranted. Yet performance disparities remain at City High, and Black students remain highly marginalized socially and economically throughout the Pittsburgh Region. Simply stated, Black students at City High outperform their local counterparts, and for years that fact seemed to confirm that the school had been doing its best to support Black students. However, as times change and the administrative and faculty consciousness has risen dramatically over the past half-decade or more, a critical mass of

stakeholders at City High realize now that there exist many unexplored possibilities for ways to more fully and intentionally focus on Black student learning; programmatically, curricular, instructional, opportunities, and more.

At the center of this project lies the question of how to shift the school's teaching culture towards a mode of practice that is likely to further accelerate engagement, learning, and performance for Black and multiracial students. Culturally responsive pedagogy provides a powerful opportunity to do just this. Teaching in a manner which draws upon the lived experiences of Black and multiracial students, empowers students within a classroom to form a community of inquiry around injustice and inequality, and embraces Black student culture as an untapped reservoir of learning potential is likely to advance the goal of building a more culturally responsive teacher culture and accelerate Black student growth.

There are a range of organizational dynamics which make this endeavor challenging to pursue, which this project hopes to at first evade and then change. As illustrated in Appendix C, the "fishbone diagram of problem of practice," a range of factors have resulted in teachers not understanding, creating, and implementing culturally responsive pedagogy. These factors include but are not limited to, the overall Whiteness of the staff and the lack of sustained interrogation of said Whiteness, the past lack of school leadership modeling a focus on race, culture, and disparity (which as noted, has shifted significantly in recent years), the past lack of attention to race and culture in teacher evaluation, the worsening problem of recruiting Black teachers, the inadequate teacher preparation with respect to attention to urban educational dynamics, the original color-evasiveness in the school, and the still nascent professional development program on race, culture, and disparity in the school. These norms - many of which are changing - have had the positive effect of allowing all students to grow and perform well at City High, while also the negative effect

of allowing the school to pay insufficient attention to racial disparity and Black student achievement more broadly.

The school is tightly organized by grade level (there are four teams of teachers who loop with students) and department (math, science, cultural literacy - which is English and history, financial literacy, technology, and information literacy). Team culture is a critical variable in managing a group of 150 students within a particular grade as they make their way from 9th to 12th grade, but according to annual staff surveys and interviews with teachers, it is the department cohesion where the most serious attention to pedagogy, methodology, curriculum design, and professional growth takes place. Therefore, this proposed intervention will attempt to draw upon this strong departmental culture and leverage the vigor and cumulative experience of a group of seasoned Science teachers who already occupy a well-established learning community, which has been shown to be important to supportive and critical growth among urban educators (Williams, 2013; Tan & Thorius, 2019).

3.2 Research Intervention

Appendix D contains an organizational “driver diagram,” which is a visual representation of several crucial components of this project which, according to the Improvement Science methodology, have short and long term goals which are useful for clarifying purpose and the interconnectedness of organizational systems (Perry, Zambo & Crow, 2020). The short-term goal of this change idea was to help White teachers learn how to create and develop culturally responsive curricula which centers their Black students. Aside from being intrinsically affirming and equitable, if this intervention were promising and scalable, research suggests it would have

the long-term effect of accelerating Black and multiracial student performance (measured by QPA, Keystone Exams, graduation rate) and Black and multiracial student growth (measured by PVAAS, STAR, and ACT Prep Sequence - EXPLORE Test 9th, PLAN Test 10th, and ACT in 11th). Importantly, this objective was not oriented around bringing Black and multiracial students into parity with their White peers, but rather recognizing the historical and contemporary inequities which affect the majority of City High's students and using the school's resources to help these students achieve at greater levels than previously attained.

The participants in this study were the five science teachers at City High - all of whom are White, one of whom is male. The science teachers are all known to be strong teachers, have "growth-mindsets," and have all expressed a mixture of interest and confusion about culturally responsive teaching in science classes. According to conversations and interviews with math and science team members, prior equity trainings have had the unintended effect of them feeling "left out" of serious discussion of culturally responsive teaching at City High and establishing the perception that culturally responsive teaching is "for humanities classes." For these and other departments, culture, race, language, music, community dynamics, and more, continued to be seen as outside the reach of science department norms regarding instruction and curriculum development, and these teachers aspired to change that reality.

Yet notably, the science courses at City High also tend to have elements of culturally responsive classroom norms, even though these norms were not developed with the expressed purpose of leveraging Black cultural capital. Walking into one of these classes one will be guaranteed to see students moving, collaborating, discussing, debating, learning together as a group, feeling safe to take risks, making choices during learning activities, exploring, recording learning in multiple ways, and more. So the methods of our science teachers have some elements

of cultural responsiveness according to the notions of what it means to promote a community of supported learning in ways which draw upon some of the learning traditions of Black and indigenous cultures (Hammond, 2015).

However, from a curricular standpoint, these courses lacked critical and cultural content which specifically focuses on issues relevant to the past and present circumstances of Black and marginalized students. Scholars like Ladson-Billings and Gay have posited that culturally responsive teaching develops socio-political consciousness, affirms student identities and lives, makes classrooms a space for marginalized students to challenge the status quo, and empowers Black and other marginalized student groups - and one of the primary ways this is done is through drawing up on student context and the social, political, and economic issues which affect the actual conditions of their lives (Ladson-Billings, 1995, Gay, 2002).

Beginning in January 2022, this intervention was built around a 4-part workshop with the science teachers at City High. Each workshop was two hours long and took place in a secluded classroom at City High. Using grant money available to the school for teacher improvement, the five teachers were paid at a professional development rate determined by the school's CEO (Dr. Dara Ware Allen). As City High moved to a four-day teaching model with alternating Mondays as staff workdays, these workshops took place on the first four Monday work days which run through January and February (Jan 10, 24, and Feb 7, 21). The teachers then had two weeks to revise or create a lesson which applies the principles and skills they have focused on throughout the four-part sequence.

While the workshops themselves were expected to be, at times, fluid and dynamic, there were several aspects of the professional development sequence which, regardless of specific curricula used, were relatively fixed. For example, the teachers exploring their White racial

identities and culture is an aspect of the intervention is necessary to address one of the central dimensions of this project - Whiteness, and what it means to operate in a space full of Black and multiracial students in urban contexts (Emdin, 2011; Sensoy, & DiAngelo, 2017; Utt, & Tochluk, 2020).

The third component of the series was a careful explanation and lesson study of culturally responsive curriculum in a science classroom (Coenders, & Verhoef, 2019). Drawing upon excerpts from Ladson-Billings and Gay, the third workshop series defined this mode of practice in terms which build upon the prior workshops focused on teacher/student racial and cultural exploration. This third experience featured a systematic lesson study from a high-quality science curriculum, which is centered upon science-related social justice issues which impacts the Black community - such as lead in pipes and paint, exposure to toxic dump sites, particulate matter near power plants, disparities in health care and treatment, lack of dense foliage in communities, food deserts, vaccine hesitancy, etc. – or conversely the inspiring and rich history of Black naturalist traditions, today’s Black community gardening movement, Black environmental activism, wellness traditions, and more.

Using this lesson study, we collaboratively identified the necessary components of a culturally-responsive lesson, and analyzed all of the requisite reflective and planning work which may have preceded this lesson. The group collaborated to deconstruct how their own racial and cultural backgrounds, as well as their students’ racial and cultural backgrounds, would inform how this lesson would be implemented in their classrooms. This exercise was a natural culmination of the first two workshops as an example of how White teachers can bring science content closer to the lives of their Black student, and help the group begin to develop some self-awareness about their own skill development as culturally responsive educators.

The fourth and final workshop was a longer, 3-hour co-planning workshop, where each teacher (9th - physics, 10th - biology, 11th chemistry, 12th, scientific research, and 11th and 12th elective - mixture of all science disciplines) discussed plans to revise an existing lesson they planned to use in the next two weeks to be more culturally responsive and connected to Black students' lives. Teachers also had the option to create something entirely new in this collaborative environment. Participants workshopped ideas openly and carefully, asking questions about curriculum, student connections, material variables, and learning objectives for the proposed lesson. These teachers prepared their proposed lessons before this workshop between the third and fourth session. Each teacher had 30 minutes to share ideas and receive feedback from their peers, and upon the completion of the workshop will have two weeks to implement the lesson.

3.3 Data Collection Strategy

Prior to beginning the workshop series, teachers responded to open-ended survey questions and engaged in follow-up interviews to establish an understanding of their prior perception of the relevant subjects before beginning the study. Workshops were recorded and transcribed, and at the end of each workshop, teachers wrote in reflective journals about their experiences engaging with the content. At the culmination of the entire workshop series and lesson implementation, teachers engaged in final interviews, which sought to capture whether the intervention facilitated some meaningful change in each teacher's pedagogy and practice. The data collection taking place in this study were open-ended written surveys, interviews, transcribed workshop conversations, and journal reflections. The explanatory potential of this amount of qualitative data is significant, as the inevitable ambiguity which arose throughout the study can be cross-referenced with against

data in order to establish more accurate interpretation of respondent attitudes (Menter, Elliot, Hulme, Lewin, Lowden, Lowden & Hall, 2011) and will serve to make research findings more clarifying with respect to the effectiveness of the research intervention (Weston, Gandell, Beauchamp, McAlpine, Wiseman, & Beauchamp, 2001).

3.4 Inquiry Question

The primary inquiry question of this intervention, which studied through survey and interview data collection, was “how do White science teachers experience creating and implementing culturally responsive curriculum in a science classroom?”

While the scope of this question is vast, the following survey and interview questions were used throughout the process to gain a more sophisticated understanding of the relevant topics and issues addressed during the study.

- What does it mean to be a White science educator in a diverse urban school?
- As a White science educator in a diverse urban school, how important is it to understand topics like race and culture?
- When it comes to understanding topics like race and culture, generally - where do you feel strong? Where do you have room to grow?
- How do you define culturally responsive pedagogy?
- How do you think about culturally responsive pedagogy in science education, generally?
- When it comes to understanding science related topics related to Black communities - past or present - where do you feel strong? Where do you have room to grow?
- Do you see yourself as a "culturally responsive educator?" Please explain.

Upon completing the study, the following interview questions were asked to continue to add nuance to my understanding of the layers within the inquiry question.

- Talk about your culturally responsive lesson – how did you experience directly teaching about race, racism, and social issues in your science class?
- Did your understanding and ability to create culturally responsive science lessons evolve throughout the study?
- What concerns or questions remain for you about culturally responsive science teaching, short or long term?
- Are there any other reflections you would like to share about your practice at the conclusion of this study?

3.5 Pre-Study Survey and Interview

As previously described, the study began with teachers completing open-ended survey responses, and engaging in follow-up interviews with me. Similar to a traditional PDSA cycle, where pre-survey data collected is primarily intended to establish baseline data against which progress will be measured, these survey questions were intended to both present the language and concepts relevant to the study and also to signal the aims for the research intervention. By asking White teachers to reflect upon their identities as White urban educators, their understanding of race and culture, and their understanding and attention to culturally responsive science pedagogy, I essentially began a conversation with them; a conversation I am also a participant, albeit from the perspective of a White urban humanities educator. Follow-up interviews were tailored based

on survey responses, to clarify and unpack certain statements of phrases previously expressed in writing. For example:

- Survey Question – “What does it mean to be a White educator in a diverse urban school?”
- Teacher 2 Written Response – “It doesn't really mean anything to me about being a White educator and a diverse urban school... I just come and try to teach and get everyone passionate about the importance of science”
- Follow-Up Interview Question – “Would you have the same understanding of your identity as an educator if you taught in a mostly White, wealthy school?”

These interviews were also in establishing my own role as researcher/facilitator. Due to my own longstanding relationship with these teachers, my own well-established commitments to social justice and equity in teacher practice at our school, my own Whiteness and experience as an urban educator, these conversations allowed me to be transparent about my status as facilitator, not just researcher striving to distance myself from our work. While I have strong rapport with each participant, we seldom have extensive and personal conversations about race and teacher pedagogy. Engaging in targeted follow-up interviews afforded me the opportunity to relate to these teachers about my own journey of exploring Whiteness, social justice in the classroom, thus further establishing our unity of purpose in this professional development endeavor.

3.6 Workshop 1: Whiteness in Urban Science Education

Our first workshop was structured very similarly to each of the subsequent workshops that would follow; introduction and brief overview of the schedule, reading or viewing an artifact, 10

minutes of silent reflection in journals, 15-20 minutes of discussion, and then moving on to another artifact. Discussion within the group would regularly exceed the 20 minutes allotted, as someone would find some idea or connection which evoked stronger reactions and would necessitate some further attention and processing. This first workshop was one of the first times this group ever had a structured, intentional, *conversation* about their Whiteness but also about race and racism broadly. Some participants were highly expressive, some less, but each participant was positively engaged throughout the process.

I started introducing content using the video “Origins of Race in the United States,” a PBS video written and narrated by Northwestern University professor of Africana Studies, Danielle Bainbridge. The video is rich with scientific language, and takes a highly critical view of the role of Enlightenment thinkers and Western scientists, who worked tirelessly to categorize and organize humanity into similarly rigid and hierarchical structures as it did with other parts of the natural world (Bainbridge, 2019).

After journal reflection and discussion, we read an article from the National Science Teachers Association, titled “White Science Teachers, Here’s Why Anti-Racism Includes You!” The article critiques widely-held views among science educators that science is “about the facts” and doesn’t deal with issues in society the way humanities courses are accustomed. It asked questions like, “What beliefs are present/perpetuated about who gets to do science?” “What beliefs are present/perpetuated in science about race and cultures?” “What phenomena are relevant to our students, their families, and the community?” “When and how do we allow students to make connections to their contexts and experiences?” Critically, this article centered the responsibility of White science educators to assume a self-interrogatory stance by exploring their own

misunderstandings and lack of knowledge about the lived experiences of their students from marginalized communities.

After journaling and discussion, we read one final article, “Here’s What I Wish White Teachers Knew When Teaching My Black Children,” by Afrika Afeni Mills, an educator and parent. In this piece, the author writes passionately about her fears and hopes for the White teachers who educate her children, focusing on issues like stereotype threat, culturally relevant teaching, high expectations, and an asset-based framework through which to view her Black children.

Teachers were highly engaged and eager to discuss dynamics related to being White teachers in a diverse urban school. The workshop’s purpose was to shift their attention to their own positionality and stimulate some dialogue around what it means to be a White science educator at a school that serves a starkly unequal student body, and conclusively acknowledge all of our Whiteness and privilege in a way that marked the starting point in what I hoped would be a candid and honest journey forward. Aside from my own struggle to effectively manage the time we spent on various tangents and keep the group moving forward, the group appeared to have had a positive and constructive conversation which seemed to establish a modest beginning to much deeper pedagogical work around culturally responsive science teaching. One cannot seriously consider another’s racialized experiences or cultural identities until one acknowledges that they, too, are shaped by and in relation to, these same racial and cultural forces. While this was only a first pass at this way of seeing ourselves as White educators, it prepared the ground for further reflection and work.

3.7 Workshop 2: Science and Racial Justice

The purpose of the second workshop was to direct attention to some of the relevant “science” issues that disproportionately impact Black communities, in the hopes of moving the group from the recognition of their own Whiteness and their responsibilities as urban science educators, to expressly seeking to bring their scientific expertise to issues of inequity and justice which oppress marginalized, majority-Black communities. As previously stated, a common retort heard over the years about “equity work” is a complaint that – outside of the humanities departments, this work has little relevance in STEM fields. This workshop sought to conclusively disabuse everyone of that misperception. After a brief introduction and overview of the schedule, our work began with an article called, “Social Justice in the Science Classroom,” which again came from the National Science Teaching Association. This piece argues that science teaching is grounded in the lived experiences of students and expressly focused on learning for critical consciousness and social change. Perhaps most notably, the piece included a list of more than 30 social justice science topics.

The second article we studied was The National Black Environmental Justice Network’s “Environmental Justice and Environmental Racism Statement,” an organization founded by Dr. Robert Bullard, considered one of the foremost scholar/activists in the environmental justice movement. In far more vivid terms, this essay offers a searing criticism of environmental racism and the scientific impacts that inequality and exploitation have had on Black people and communities. One of the topics addressed was “redlining,” the process through which the federal government “systematically disadvantaged low-income and minority city-dwelling residents from obtaining mortgage financing, and by midcentury they exacerbated the disproportionately substandard urban housing conditions endured by nonwhites in the United States” (Woods, 2012).

A surprising development of the workshop, this topic was genuinely new to most of the group, and we spent some time digging through some of the HOLC maps, including Pittsburgh's, which clearly illustrate the way these policies solidified *de facto* segregation into *de jure* segregation. The group recognized the reservoir of science content connections here, as well as expressing dismay at the history of segregation in our city.

Lastly, we spent some time exploring the aforementioned 2019 study "Pittsburgh's Inequality across Gender and Race," which was commissioned by the City of Pittsburgh's Gender Equity Commission. After a short explanation of the visual representation of the data, the group was given 15 minutes to comb through the report. Reactions were stark yet not fatalistic, as the study elucidates just how abysmal Pittsburgh is for Black citizens, particularly women, yet there was a widespread recognition that there existed a vast amount of eligible and urgent science connections which would be brought into the classroom.

3.8 Workshop 3: Culturally Responsive Science Lesson Curriculum Study

The third workshop in the sequence was intended to build upon our prior sessions by exploring clear examples of culturally responsive science curricula. Having begun exploring and interrogating our positionalities as White urban educators, then turned our focus towards the social justice science issues facing our marginalized, mostly Black, students, the goal for our third meeting was to carefully consider some concrete examples of teachers putting these core ideas – critical awareness of Whiteness and social justice science issues – into practice within actual lessons. The first unit we considered from the Science in the City Lab at Stanford University, titled "Politics and Heat: How Racist Policy Can Contribute to Climate Change (Brown, 2019).

Aligned with Next Generation Science Standards (NGSS), this unit was created by a groups highly culturally responsive science educators who understand the interconnectedness of science and racial justice. The unit specifically explores how climate change interacts with gentrification, considering a range of scientific and human impacts. Teachers explored the unit and discussed the way it brought relevant social issues into the science classroom, though had some concerns about practical implementation and some of the logistics and timing described.

The second artifact considered was a far more robust and well-developed unit from Fred Hutchinson Cancer Center, a non-profit who has a substantial educational division. The unit, also closely aligned with NGSS standards focuses on mass incarceration, and the DNA technology being used to exonerate wrongfully convicted inmates who are disproportionately men of color. Teachers reacted strongly to how thorough, well-organized, and well-researched the unit was. There was a palpable sense of excitement around seeing such an impressive example of culturally responsive science curriculum.

3.9 Workshop 4: Culturally Responsive Lesson Proposal

The fourth and final workshop was designed to respond to the most common response I and other school leaders have heard from countless teachers, but especially science and math teachers over the years after attending lectures at CUESEF, or the School of Education at Pitt, or doing equity professional developments; namely that for math and science teachers, professional developments about social justice and equity never make contact with real lesson design in any meaningful way. Prior to this session, teachers were given a clear assignment – look at the final two weeks of curriculum they had left, and find a way to create a new lesson that integrates the

culturally responsive practices the group has been working on for the prior several months. Each teacher would present their plan, receive immediate feedback from the group, and then implement the lesson in their classroom. A brief summary of each teacher's proposed lesson:

- Teaching experimental design by looking at inequality of air pollution
- Exploring the impact of redlining on urban ecosystems
- Application of DNA technology to exonerate the wrongly convicted
- Studying the inequities within the human impact of climate change
- Exposing racial inequities and the COVID-19 pandemic

3.10 Post-Study Interview

The study ran directly up until the very last day of the trimester, which was the agreed-upon termination date for the group, thus the study concluded with interviews which sought to invite teachers to articulate and describe their experience with the professional development sequence. These interviews, like so much of the work throughout the study, turned into dialogues as it was impossible to completely shed the multiple layers of my relationship with the participants and our shared commitment to the craft of teaching, particularly at City High. The conversational nature of these interviews afforded me the opportunity to ask clarifying questions in real time, and to invite further elaboration about specific points mentioned by each teacher. Below are the primary questions which guided these interviews:

- Talk about your culturally responsive lesson – how did you experience directly teaching about race, racism, and social justice issues in your science class?

- Did your understanding and ability to create culturally responsive science lessons evolve throughout the study?
- What concerns or questions remain for you about culturally responsive science teaching, short or long term?
- Are there any other reflections you would like to share about the impact of this practice on your practice?

4.0 Reflexive Thematic Analysis

4.1 Reflexive Thematic Analysis Overview

Qualitative data collected throughout this multi-month intervention will be analyzed using Reflexive Thematic Analysis (RTA), an approach to qualitative thematic analysis most substantially articulated and developed by Braun and Clarke, in 2006 (Braun and Clarke, 2006). There are several reasons this methodology is the most useful way to approach a study of this variety. First, RTA acknowledges and addresses researcher positionality and subjectivity in the research process. RTA demands that the researcher recognize their theoretical approach to the subject matter and philosophical principals at hand, but in a study such as this where the researcher is also a colleague and fellow practitioner within the organization, any other relevant dynamics and commitments are made explicit (Braun and Clarke, 2021; Byrne, 2021). Second, RTA recognizes that the researcher is actively generating themes from coded data, which improves transparency around the process and assumptions being made on the part of the researcher interpreting the data – all of which are described in the earlier chapters of this document. It means abandoning the notion of “objectivity” which is fraught with unacknowledged privilege and power, and instead candidly striving to make good-faith efforts to interpret data by situating the researcher within the relevant discourse and interpretation (Braun and Clarke, 2019). Thirdly, RTA allows for versatility and flexibility within a prolonged, multiple-month, and multiple-method study such as this; composed as it were, of open-ended survey questions, journals, interviews, and group workshops. Codes and themes may change throughout the data collection and interpretation stage - whether they grow, reduce, or split – and RTA contains an intrinsically malleable approach which

not only can accommodate such developments but can help make sense of them (Braun and Clarke, 2021; Byrne, 2021).

Importantly, the themes generated will necessarily align with initial inquiry questions which guide the overall exploration of the problem of practice and subsequent intervention. My goal here is to place the Improvement Science/PDSA framework in which this study was conceptualized in conversation with RTA, which offers a nuanced way to interpret the qualitative data produced throughout the study. To reiterate, those three inquiry questions, which will anchor the categorization of the themes, were:

- How well do teachers understand the racial and cultural identities of themselves and their students?
- How do White science teachers experience creating and implementing culturally responsive curriculum in a science classroom?
- Based on the experience teaching a culturally responsive science lesson, what was learned and what are the long-term implications for practice?

RTA contains 6 stages of this qualitative analysis methodology, which are worth outlining here as stated in Braun and Clarke's seminal 2006 paper detailing how to use RTA (p. 87-88):

- 1) **Familiarizing oneself with data:** "Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas."
- 2) **Generating initial codes:** "Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code."
- 3) **Searching for themes:** "Collating codes into potential themes, gathering all data relevant to each potential theme."

- 4) **Reviewing themes:** “Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.
- 5) **Defining and naming themes:** “Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.”
- 6) **Producing the report:** “The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.”

4.1.1 Familiarizing Oneself With Data

Upon beginning my initial review of the data collected throughout the study, several aspects of my role in the process stand out as worthy of reiteration and transparency. I am a White urban educator, like the participants. I work in the exact same context as the participants. I have known these teachers for anywhere between 3-10 years, and several of them I have very strong professional relationships. I have been one of the primary figures involved in promoting equity, justice, and culturally responsive teaching at this school for the past 7 years officially (at the school level), and longer unofficially (within my own classroom). The title I hold in our school is “Educational Leader,” which is to say, a senior faculty member in good standing. The department has long been vocal with me, privately, about their frustrations with prior professional developments on these subject and were primed to buy-into the workshops. All of these factors favorably coalesce to afford me the highest possible level of trust, candor, and good faith effort from the participants. While I absolutely believe these teachers to have been earnest in their

collective drive pursuing culturally responsive science teaching in the past, the amount of immediate rapport, comfort, and respect within our group likely increased engagement, increased willingness to take risks, increased their threshold of overall exertion with the study.

Another notable aspect of the familiarization phase, is accounting for the unique structure of the study and data it produced. Respondents' words and ideas were communicated through multiple mediums; survey responses, interviews, conversations, and sprawling workshops – all of which regularly featured many tangential lines of dialogue in the course of our work. This study was not a characteristic “pre and post survey” study, but rather a generative and holistic process of collaborative learning through multiple modes of dialogue. While the amount of data produced was voluminous, it offered extensive opportunities to identify patterns, topics, and feelings related to the goals of the intervention – to help this group of White science educators improve their ability to create and implement culturally responsive science lessons.

4.1.2 Generating Initial Codes

For the second phase of the analysis process, I read and reviewed data at the person-level, beginning with their open-ended survey responses and the subsequent follow-up interviews. This approach helped me establish a deeper sense of understanding of each of the teachers in the study, before moving to analyze the collaborative phases of the intervention. I was able to establish some specific familiarity with each teacher's attitudes, predispositions, and prior experiences with topics like race, racism, urban education, and culturally responsive science education. I used a spreadsheet to record and catalog important or relevant comments from each teacher related to the aforementioned research interests of this project.

I then moved to read and review the transcripts from the workshops which, despite being vastly more conversational, informal, and unfocused than the survey questions and interviews, placed the teachers' ideas about the research topics in conversation with one another. This proved to be a dynamic process, full of people agreeing, disagreeing, broadening, refining, and deepening understanding of remarks and statements. Like any rich conversation, new doors were opened and explored, old stories and context were rehashed, questions were raised, and more. In reviewing the transcripts, the feelings of community I recall experiencing with the group were quieted as I approached the text with the intentional effort to soberly appraise the content of the dialogue throughout the process. Using a spreadsheet again, I chronologically noted both the participant and the relevant insights shared, thereby closely mapping the flow of the conversation, tracking how topics fed into one another, and establishing context for particular statements.

For each workshop's reflection journals and final interviews, I again approached the data at the person-level, replicating the process used for the initial data review. After reading and reviewing the group workshop data, studying the person-level data once again supported my efforts of understanding the individual level experiences throughout the study.

4.1.3 Converting Codes to Themes

In this step of the data analysis, I re-reviewed all of the notes collected from the initial reviews of surveys, interviews, journals, and workshops. In doing so, I began generating initial themes, or categories, in which to organize some of the important and relevant pieces of dialogue. In this first attempt, I generated several potential themes.

- 1) Developing a basic understanding of Whiteness
- 2) Reflecting upon lack of proximity to, and experience, in Black communities

- 3) Understanding and exploring racism as an historical and ongoing system of power
- 4) Learning about science-related social justice issues in urban communities, which disproportionately impact Black people
- 5) Being able to understand and imagine culturally responsive pedagogy in science
- 6) Inexperience implementing and lack of prior training with culturally responsive pedagogy
- 7) Navigating avoidance of messy and controversial social issues in science class
- 8) Lack of leadership and mentorship on culturally responsive teaching
- 9) Keystone Exams and the power of department status quo as barriers to innovation with curriculum
- 10) Prior frustration with “equity” trainings
- 11) Becoming confident about the potential impact of culturally responsive pedagogy for marginalized students
- 12) Considering potential long-term structural changes for the science program overall

4.1.4 Reviewing Themes

Upon considering the data set in light of these potential thematic categories, I decided to organize the ideas contained within the dialogues. By adding an additional layer of organization as recommended in RTA, I further refined my ability to understand the deeper themes which underpinned the wide range of data coming from the participants. Also, this allowed me to present my findings in a manner which “answered” my inquiry questions. While many of these initial themes could have been organized into more than one of the final thematic categories, I exercised careful discretion in filtering data and used the context of each conversation and any additional reference points to help categorize data.

Table 1. Development of Themes

Phase 3: Potential Themes	Phase 4/5: Themes
<p>Developing a basic understanding of one’s own Whiteness</p> <p>Reflecting upon lack of proximity to, and experience in, Black communities</p> <p>Understanding and exploring racism as an historical and ongoing system of power</p>	<p>Theme: Learning about and engaging with race, racism, and social justice issues in professional setting</p>
<p>Learning about science-related social justice issues in urban communities, which disproportionately impact Black people</p> <p>Gaining exposure to concrete examples of culturally responsive pedagogy in science curricula</p> <p>Inexperience implementing and lack of training with culturally-responsive pedagogy</p> <p>Prior frustration with “equity” trainings</p> <p>Aversion to “messy” and controversial social issues in science class</p> <p>Gaining confidence creating and implementing culturally responsive science lessons</p>	<p>Theme: Studying and implementing culturally-responsive science pedagogy</p> <p>Understanding culturally responsive science pedagogy and overcoming barriers to implementation</p>
<p>Perceived impact on student engagement and learning</p> <p>Need for continuous implementation, growth, and reflection</p> <p>Navigating Keystones and existing curriculum as barriers to innovation</p> <p>Considering long-term impact of culturally responsive growth on the science program overall</p>	<p>Theme: Considering impact on student learning, overcoming barriers, and strengthening commitment to culturally responsive science pedagogy</p>

4.1.5 Producing the Report

The final phase of the process culminated with my attempt to thoroughly distill the experiences of the participants and the impact of the intervention overall. As explained in previous chapter, the problem of practice this study aspired to intervene upon was “White teachers struggle to create and implement culturally responsive pedagogy.” This professional development sequence was a strategic intervention which aimed to improve teachers’ ability to implement these evidence-backed practices by first establishing clear language about our positionality as White urban educators in a diverse urban school and the racial dynamics therein, build a strong foundation of knowledge about science-related racial justice issues and culturally responsive science pedagogy, and finally providing a structured and supportive opportunity for these teachers to create and implement a culturally responsive science lesson. At this point in the thematic analysis, I was beginning to understand of how, when, and why participants experienced and encountered not just a range of ideas, but a range of feelings throughout this study. Here, my positionality as a researcher, and also as a fellow White practitioner and colleague of these teacher, certainly colors my interpretation and characterization of the conversation, yet I felt that it was important to try to capture some of the non-verbal content of the discourse.

4.2 Reflexive Thematic Analysis Themes

4.2.1 Theme 1: Learning About and Engaging With Race, Racism, and Social Justice Issues

4.2.1.1 Developing an Understanding of One's Own Whiteness

Teacher statements about their own Whiteness, self-conceptions of themselves as White people, and the way they understand themselves as White urban educators were primarily confined to the pre-study surveys and interviews and the first workshop, which was focused on Whiteness in urban science education. This observation is consistent with the stated purpose of the intervention. Notably, I didn't want to create a workshop intended to critically deconstruct and interrogate Whiteness writ large, but rather to establish a common starting point for the group in naming their Whiteness and beginning the process of exploring the ways their practice may be constrained by failing to explore their Whiteness.

Any effort to examine issues related to race, social justice, and education – especially on the part of White teachers – must be connected to some level of critical self-awareness regarding one's own positionality as White. White teachers interested in more effectively engaging a diverse group of students cannot merely understand their students' racial and cultural identities, but must begin with a recognition of themselves and how the experience of growing up White impacted their lives and worldviews; and how their perception of urban communities of color and their work educating students from these communities has been constrained. The group explored their own backgrounds, the way they feel about being White in a diverse urban school, and more.

- [Being White] that's my skin color...there's nothing I can do to change it...I have White privilege, and I did have people in my family who referred to Black people in derogatory ways...

- “Until I started working at City High, I don’t think I ever thought ‘OK, I’m a White person’...and I definitely grew up in a racist household”
- “As a White educator I feel like there's a lot of pressure on myself to give them all the information that they're lacking outside of the walls of City High...”
- “Can’t change it, I’m White...but I want to be a good teacher for these kids”
- “Self-reflection. I'm really gonna have to really...think about how I how I communicate with my students...”
- “Being a White science educator with a student body that is vastly more diverse than that of my upbringing, I know that there is an inherent disconnect between my life experiences and those of my students...I don't know what it ‘means’ to be a White urban educator...”
- “I'm not trying to patronize anyone but it's important to understand, I think. How they learn, how they, how they experience the world...and I think that has a lot to do with their culture...different experiences in the world and have different views, they have different mannerisms and attitudes towards things...”
- “I know that I'm a white woman. I know that I am teaching black students. But how, how do I sort of turn that to where I can have a conversation and it just be fluent and not scripted?”
- “I never took some of that [racial background] into consideration because I just viewed the students as just people and your students in my classroom...”
- “[as White people]...we're never going to be at that point where we can sit across from the table and understand exactly what they're going through”

4.2.1.2 Reflecting Upon Lack of Experience in and Connection to Black Communities

The teachers in the study are all individuals from nearly all-White communities in rural and suburban Pittsburgh. Part of the process in naming and exploring what it means to be White in a diverse urban school was to simply discuss their backgrounds in racial language. As one of the core objectives is to become curious about and increase understanding of the relevant issues in urban communities of color, for several members of this group this meant articulating facts about their upbringing which may have historically inhibited their ability to gain experiences in and acquire familiarity with the communities from which our students come to our school. There was uniformity in the group's overall lack of close contact with Black communities in the past and present, though

- “I live in an area with mostly White people...I can count on one hand the number of African American students [I went to school with]”
- “We all strive for bonding...but there's something missing... I'm an old white [person] and they are mostly young Black people...they maybe don't think I can relate to them...”
- “ I grew up in a White town...my main exposure into working with Black youth was [in a service program in college]...I wasn't even thinking about culture or anything like that...I was younger and it wasn't even on my radar...”
- “I struggle in an attempt to make these connections [with students' lives]...I do not have these life experiences that some of my students do...”
- “I grew up in like white suburbia, you know, and I had a few Black friends...some would play sports with or have classes with, but I was never like super close with them...always friendly though...”

- “I may be wrong because I don't live it but I know the kids experience racism...in their face or it is subtle, but they feel it...”

4.2.2 Understanding and Exploring Racism as an Historical and Ongoing System of Power

Another fact that the intervention highlighted was the lack of historical understanding of racism and its effects, both in society at large and particularly as it pertained to science topics. The teachers explored journalism, studies, and curriculum which were all historically informed and highlighted the need for the group to engage in a more sustained examination of racial inequities and the ways racism impacted both the past and our present. Reactions ranged from authentically learning for the first time the ways racism defined so much of scientific discovery in the past, to considering their own exposure to racism in schools, to a shared understanding that our students still encounter racism in their lives.

- “It’s amazing – in a bad way – that they used *science* as a means for prejudice...”
- “I'm still blown away...I had like a hard time...now that I know about redlining...like everything in here is because of that. So it's unbelievable...”
- “...there is distrust [among Black communities] in science, and it goes all the way back...”
- “The etymology is still basic White English...so it's really hard to get away from when this has become now our standard way of communicating in in science...”
- “When I was in [another local school district] we had racist teachers, and we had racist administrators...I was appalled...but it also was very difficult to stand up to do anything...it’s one of the reasons I'm not there anymore...”

- “I definitely did not pay attention to, and I think this stuff that we learned like it like in history class, it was American history, it was about white people...it was about ‘you,’...like you hear about civil rights movement but that was it, we didn't I had never heard of Jim Crow laws or any of that...I might be an educated white [person] but I'm also very uneducated...on a lot of topics.

4.2.3 Theme 2: Studying and implementing culturally-responsive science pedagogy

4.2.3.1 Inexperience and Lack of Training with Culturally Responsive Pedagogy

As communicated in all of the pre-study surveys and interviews by participants, the teachers in the department lacked training and experience with culturally responsive science pedagogy. While each individual had some vague understanding that culturally responsive teaching was “meant to connect content with students’ lives,” they had never had any educational or professional experience that brought their traditional training in science instruction into contact with contemporary currents in education related to social justice or culturally responsive pedagogy. The group also noted the lack of leadership historically at the school with respect to culturally responsive pedagogy, yet felt that the leadership culture was changing. There was also agreement in the group on the disconnection between departments, which limits their ability to confidently know students’ prior knowledge and ability to navigate difficult or controversial material.

- “[I have asked speakers] ‘tell me how to do it’...and there is no answers there...we didn’t have anyone giving us an answer...”
- “[presenters always ask] have you used hip hop and rap? Oh, yeah, there's always the corny raps of different topics. But then I'm like, am I offending anyone...”
- “What would it [a culturally responsive science lesson] look like...as a template?”

- “I don’t think we’ve ever had a leader that’s going to know how...a person who is going to get us past a certain point [with culturally responsive teaching]...”
- “[Former school leader] used to say ‘do something fun...science should be fun...’ well, maybe [culturally responsive science] can be fun to just like a different kind of fun”
- “One of our barriers is I don't feel connected to other departments to know when they talk about out things and what their background knowledge would be”

4.2.3.2 Prior Frustration with “Equity” Trainings

Like all teachers, this group has experienced a wide range of professional development experiences in and out of the school. In the past several years, many of these professional developments have been broadly related to equity, social justice, and culturally responsive teaching. Many of these awkward experiences not only failed to stimulate the sort of critical reflection they had intended, but they left the impression that the goal of these workshops was to awaken educators to the problems related to racism and other forms of injustice yet, aside from encouraging more empathetic teachers there was little to learn about actual teaching. Each teacher in the group was troubled by the lack of connection to actual lesson design and implementation. While this was not a topic the groups discussed at great length in this study, this sentiment is part of the reason for the title of this paper being “from theory to practice.” There is widespread agreement that many of the equity trainings staff have been to in years past have been lacking in practical instruction for teachers hoping to advance their traditional skills into more equitable and, in this case, culturally responsive teaching practices.

- “[After a series of workshops at a conference] I have my little notebook that I kept and the only takeaway was ‘do a black scientist of the week or have them posted around the room,’...but I was really hoping for some hard concrete things.”
- “I do believe that I would be able to incorporate these idea into my teaching but would need some guidance in where to begin and some strategies in how to start...”
- “I don't have that understanding [of race and culture]. So I just need to I don't know, just start from scratch here and just get some ideas. I need some techniques...”

4.2.3.3 Learning About Science-Related Social Justice Issues in Urban Communities, Which Disproportionately Impact Black People

In response to gaining some understanding of the history of racism and its impacts, and also learning about culturally responsive science pedagogy, the group made significant strides in connecting the history and their shared aspiration of better-engaging their mostly-Black students. As the workshops began to sharpen our focus on social justice science issues which primarily impact Black communities, the group’s subtle shift from seeing science as “facts and theories” to seeing sciences as a vehicle for social change, activism, and a way to intentionally connect with Black students in and out of the classroom.

- “I just don't know if the education [about social injustice] is there...and I feel like that's on *us...we* should be educated...*we* shouldn't be like ‘sorry, I'm just gonna move on...’ *we* should be teaching applicable science...”

- “[Social justice science issues] is the stuff we should be covering...”
- “This [list of dozens of science social justice topics] is a resource. I'm going to pin on my board...”
- “Just looking at this [data on racial inequality in Pittsburgh]...I got angry...and I think the kids will get angry...”
- “...I think I have a lot more to learn about specifics related to Black communities and science.”

4.2.3.4 Being Able to Understand and Imagine Culturally Responsive Pedagogy in Science

Midway through the workshops, a shift had begun to take root in the group, deepening and expanding these teachers’ sense of what they do and why they do it. There was a palpable sense that they stood at the precipice of some change, which involved taking their current skills and directing their efforts towards a focus on social change by connecting their classes with the lives of their mostly Black students. Having begun reflecting upon their own relative disconnect from the communities of the students they serve, learning about the impacts of racism which affect those communities, and then exploring a few examples of science-related social justice issues, the group was eager to make contact with examples of science curricula which directly incorporated culturally responsive pedagogy. Once they had the opportunity to explore some quality examples of such curriculum, they were then able to see what culturally responsive science pedagogy looks like, “in practice.”

- “I just needed more information of people who are doing the same work people who are implementing specific, culturally responsive practices into a *science* classroom.”

- “A unit like this it has physics it has some chemistry in there...some biology and it's got some ecology too...”
- “It's like teaching history...I think like that be fun to teach in sort of a mini history lesson...”
- “I've *never* seen a lesson in a science classroom being conducted this way”
- “[Always felt like] I don't know where to start. Like I don't know how to begin the lesson. I don't know where to start with all this because I've *never* seen a template before.”
- “[Social justice issues] have important stuff to teach...could spend hours searching and reading but everything you need is [in a lesson like this]”
- “...I have started [to think] that if there can be a cultural or racial connection with those topics... the more engaged the students will be...there will be more value taken from these sciences and the students can make the connections with their personal lives.”
- “[more than] giving them access to like feeling like they can do the science and know that it's a career path or something that they could do in the future”

4.2.3.5 Aversion to “Messy” and Controversial Social Issues in Science Class

Aside from the lack of proximity to Black communities and the science-related social justice issues which provide ample opportunities for culturally responsive science teaching, these teachers expressed a powerful aversion to controversial social and political issues in science class. They had no reservations about other possible controversial issues, like sex and reproduction or evolution, yet science issues related to race and social justice generated feelings of anxiety and

reluctance for the group. As previously mentioned, part of this hesitancy may be lack of historical and contextual understanding with these issues and a recognition that their own experiences as White people may reduce their credibility in approaching these subjects. Yet part of their avoidance was clearly connected to their training in and understanding of the sciences as a discipline rooted in facts, theories, and methods – not closely connected with contemporary racial and social justice issues. The sciences are content areas which are commonly understood to be places for students to explore the physical world, not explore topics related to oppression, human rights, and politically-charged problems in society. There was widespread agreement that “emotions” and “feelings” were variables in the learning environment which the group did not feel prepared to navigate.

- “I think in the past I have relied strongly on the assumption that the sciences are what they are. They do not necessarily change for who the audience is...”
- “My insecurity is that I always feel like I don't know enough about something...”
- “I can't just bring up anything [like race] they're [students] gonna be like, ‘oh, no, you're crazy. Like what?’”
- “I'm not used to dealing with the feelings...and I think the kids will get angry...so how do you use things like this [research on racial inequities in health care] in the classroom without bringing about anger and hopelessness in our students”
- “What do you do with that, in a *science* classroom...what do you really do with that...with all those feelings and with all that knowledge and however they feel?”

- “Before we open up some can of worms that we weren't ready for? You know...it gets touchy...and you just really have to be prepared and I think have a backup plan for students who are not ready to handle it and who have a strong reaction to it...”
- “[the discomfort] probably makes all of us nervous...you don't know until it happens...”
- “How are we going to talk to kids who take exception or who have strong reactions...how will the black students respond versus the white students respond, versus the other kids have all kinds of different cultural backgrounds...what dynamics are you going to have there? Because we're not used to really opening that box...”
- “We like to ‘solve the problem’ but what if it's not a solvable problem for us?”
- “[for kids I don't know well] am I well-versed enough to talk about these issues without there being a relationship?”

4.2.3.6 Gaining Confidence Creating and implementing Culturally Responsive Science

Lessons

After the teachers proposed, reflected upon, and implemented their culturally responsive science lessons, they engaged in rigorous examination of what the experience was like for them and what they had learned. Most of the participants expressed intense anxiety related to their lessons – each of which was highly culturally responsive and dealt directly with a racial justice issue in science. All of the aforementioned variables – Whiteness, lack of strong historical context for racism, lack of training in culturally responsive teaching, and aversion to emotional discomfort

and political issues – conspired to make the experience challenging, yet each teacher exerted a good faith effort to make their first attempt. In addition to describing their nervousness around these lessons, they expressed a sense of optimism and confidence in their ability to continue in their efforts to become culturally responsive science educators.

- “Nervous, nerve-racking, didn't know how it would be received coming from me...they were wide-eyed!”
- “How deeply do [Black students] think about these things on a daily basis, and then how can I sort of use that information?”
- “It was hard...awkward...coming from our approach [in the workshops] we're sitting in the world as white people...now I have to take it to my students, which is like 85% Black people...and I'm like, ‘wait, I don't know if I was prepared for this in that capacity...’”
- “...am I saying this right? Am I offending? Am I saying the wrong things?”
- “nerve-racking...gotta do it a few times...not something that comes intuitively”
- “[talking about racism] and to jump right in without there being a relationship [with younger students] I don't know maybe it's me feeling ignorant about it, like I'm not educated enough and I don't want to like go up there and say the wrong thing...”
- “...daunting at the beginning. It got easier as the week went on. But I think even for the kids was a little uncomfortable. I think they're used to talking about race and sensitive issues and issues that they have real feelings about but not in the context of science.”
- “It's nice to talk about something that like they get and it's meaningful.”

- “I’ve lost my fear going into something like this, or a lesson or discussion...”
- “Just understanding why the issues are the way they are...I think will just make me more comfortable going forward...like having a way to show the kids like why...instead of just like what it is.”
- “Only [taught a culturally responsive lesson] one time, but, long-term we are on the road...I don't feel too confident yet but it's the right thing to do with our students”
- “I am going to do this lesson again...this made me feel like I really can do this...and can do this with other things”

4.2.4 Theme 3: Overcoming Barriers and Strengthening Commitment to culturally Responsive Science Pedagogy

4.2.4.1 Perceived Impact on student Engagement and Learning

Across all grade levels, teachers reported positive impacts on engagement and learning. Some teachers reports forms of engagement they had never experienced, as they explored social justice issues and topics directly related to race and racism in their science classes. Teachers also described non-academic dynamics, and a recognition that their willingness to explore these issues with their students marked a positive shift in relational and classroom culture. While this study has been primarily focused on how to advance teacher practice, the fundamental purpose of changing teacher practice is to positively impact student engagement and academic advancement – particularly for Black and other marginalized student groups. Reflections from the teachers on their perceptions of student engagement bear documenting at length.

- “Students helped drive the discussion...”

- “One class started making good connections between science and systemic racism...”
- “The time spent [planning for cultural relevance] is worth it for kids...”
- “Long term - this will increase trust between myself and my students...to be able to speak honestly about all this...”
- “[after the lesson] they brought [another social justice issue] to me...they were like, we need to talk about this...”
- “[using social justice lessons] would really boost the buy in from our ninth grade...talk about things that really affect their lives and that they've never had the opportunity to talk about before in science...”
- “I saw not only the black students but a lot of my white students were really engaged...I think everyone will find this valuable...if we can do it right”
- “It was eye opening for me to see where the kids were coming from and... just hearing their stories...on how they relate to this...It was eye opening for me...”
- “When you bring to light the things that are happening outside of these walls, it adds a level of engagement that I never even knew existed...every single person participated in my discussion...they had knowledge because it's real life experiences that they are living. They didn't even have to read the article to bring in the things that they were going through...”
- “...the kids were invested in it... they were definitely more interested in the social aspects that we were talking about”

- “The second day [of the lesson], they were working on their group thing and they actually came up to *me*, because I was sitting with another group... they wanted to elaborate a little bit more - so they had interest which was great.”

4.2.4.2 Need for Continuous Growth and Reflection

While the group gained confidence and reported higher engagement and strengthening of relational bonds within their classrooms, they were also sober about the need to think about their experiences as the first step of a longer journey. Having made their first efforts in culturally responsive science teaching, a range of areas surfaced which signaled places in their lives and practices which require ongoing examination and reflection; some of which dealt specifically with their own identities, some of which dealt with their understanding of the practices contained in this study, and some of which dealt with a deeper reconsideration of the school’s approach to science education.

- “...have to keep doing it to get better at [culturally responsive teaching]
- “...we only did it one time like in practice. I'm a person who I have to practice...I'm not okay with it...so we've touched the surface. I'm happy to keep going and continuing along that path, but I've only done it that one time...”
- “...always just looked at [content] from a science point of view...but being able to connect it to the majority of our students lives makes it more important...”

- “I grew up lower-middle class, White neighborhood and this, it's really opened my eyes to a lot of what I just didn't know or hadn't been taught before and I don't understand why I hadn't been taught this...”
- “I feel like as a whole, as a content team, cross curricular working with you, even administration. I feel like there's support [for culturally responsive teaching] now...”
- “I do think it's something to be honest with the kids and say ‘listen, I'm a learning. I am not you. I cannot live your experiences. I can read about them. You can tell me about them. But what it comes down to is, I'm learning from you when we do this.’ So I think being vulnerable in that sense has helped me in my classroom.”
- “It was really great to have like the set aside time to like focus on this and think about it more as a department...so I think that that was a huge benefit having the chance to kind of dive deeper...”
- “...just kind of seeing that even if I thought I was trying to make connections, between my content and the real world, being culturally responsive...[seeing] how many there are and seeing them fit into different spots that I didn't expect.”

4.2.4.3 Standardized Testing and the Power of the Status Quo as Barriers to Innovation with Curriculum

At several points throughout the study, each teacher expressed their exasperation at the constraints imposed by Keystone testing and the existing curriculum at City High. Keystone tests

are administered to 11th grade students and at the time of this study had recently become a graduation requirement in Pennsylvania, albeit with some alternative ways for students to show proficiency. But the frustration with these state standardized tests was evident and salient in the group, for while no person expressed any philosophical alignment with the value of this form of assessment, they each felt a responsibility to the school's standing in the city, as Keystone data is publicly reported and used as a common metric for school quality.

- “I feel really bottled in by our curriculum especially...the Keystone biology stuff...there are so many other things that...I would love to focus on, but they're not in the standards and it's hard to fit...”
- “...how would you take such a content heavy curriculum [like the examples studied by the group] related to social justice...I don't know, because some classes are so ‘Keystone standard’...”
- “...when you talk about [grade] 11 it's all the Keystone test...”
- “...senior year just poses like unique like problems for science teachers...there's no creativity”
- “...that information is out there in the public...and if we're showing dismal Keystone scores...that affects people's decisions because that's just a number that's easy for people to look at...”
- “...we have to do Keystones...so I just feel like our curriculum just doesn't have enough wiggle room...”

4.2.4.4 Considering potential long-term impacts for the science program overall

Each teacher reflected upon the impact of this professional development sequence on their practice and the trajectory of the department overall. Some of these insights were unabashedly hopeful and inspired, others expressed moderate concerns about the extent to which the science program requires a “culturally responsive overhaul,” largely in light of how labor-intensive this endeavor would surely be but also around a concern that science class would become more about social issues than science. All teachers remarked on the potential of this pedagogical shift – the need to connect science class with social justice issues which primarily impact Black communities – and the prospects of building new lessons, and even new courses, which reflect this approach to science.

- “What we're doing now in this room should be the driving factor going forward...we have an opportunity to reach these kids before they leave this school in a way that's going to somehow impact out there...”
- “...don’t know where to fit it all in...don’t know what topics I can employ culturally responsive teaching with yet...what can I do next trimester?”
- “I think, if we start picking [culturally responsive teaching] up in 9th grade, it's gonna be a lot easier to have more advanced conversations as the kids get older...they're just gonna accept it as part of what we do in science...”
- “...science is always really kind of been left out and you know, some people think [social justice] doesn't have anything to do with science but that is just wrong...”
- “I think this whole [study], it's really defined what it means for something to be in equitable, and what it means to bring those topics into the classroom...”

- “I feel like by doing what we're doing...[if we start in 9th grade] that trust is the most important thing first, and then we can build upon that and have those conversations because they feel that they're going to sit in a safe space with me.”..
- “This [study] changes things in that, you know, I can't next year just go back to my folder from four years ago and hit ‘print’ ...we need to we need to stay more relevant about what's going on in the world”
- “How can we make sure that we keep focusing on [culturally responsive teaching] and how can we tell if it's more effective or making the impact that we think it's making/”
- “We've tried before to talk about social justice within science and everything like that and never had a ton of excess success really figuring out what it meant for us...so I think just seeing how we were in January, when we were just starting to think about like ‘what is race, what's our perceptions of race,’ everything like that...giving us that time to work through together... really made a difference and to kind of see what other science teachers are thinking about it what my colleagues are thinking...then realizing...we are all dedicated to doing this, you know just kind of makes you feel a little bit more like a cohesive team...”
- “We want to do a whole course...we're implementing this for senior year because it's that's real life...what we're doing right now is not real life...being able to connect it more to the majority of our students lives, makes it more important, makes it why we should be doing this in our classes.”

- “Is every lesson going to tie...back into like race and culture and all of that like is every single lesson that you do supposed to do?..”
- “...lots of good resources gained but we have to create new content...very labor-intensive...”
- “Culturally responsive topics can fit into everything that we teach across the board...but...could you sometimes take away from the science?”
- “It made me think like what other topics or conversations that we could have had throughout all of this...So, yeah, I would say eye opening and sort of like definitely stirs up some feelings on like, what else don't I know that I could be [teaching]?”

5.0 Impact and Implications of Intervention

5.1 Impact of Intervention

At the conclusion of the study and upon intensive scrutiny of the data before, during, and after the intervention, the results clearly show a positive impact on teacher pedagogy and practice. More specifically, the positive impact pertains to culturally responsive science pedagogy for this group of committed White urban educators. As previously illustrated by these teachers' own commentary, each individual teacher reported positive impacts not just for themselves as individuals, but for the science department overall.

First, each teacher gained confidence in their ability to make their practice more culturally responsive and continue revising and creating new science lessons which disrupted traditional - which is to say, color-evasive - ways of approaching scientific learning. The teachers not only reported feeling inspired and better connected with students, but reported heightened engagement and a strengthening of the learning community within their classrooms. These reported benefits suggest that these teachers realized just some of the experiential and educational incentives to a culturally responsive mode of practice and are more likely to sustain their growth.

Second, the school's senior science program, called "Independent Research Project," is designed around students gaining command of skills related to designing, implementing, analyzing, and presenting a scientific study. Prior to and throughout the study, this course was identified as a source of frustration for science teachers, as the intensive focus on building a scientific experiment, tailored to each individual student's interest, had the effect of flattening and even extinguishing the possibility of focusing on interesting science content at the classroom level.

Students were working on their own projects under the supervision of the science teachers, and while this benefitted a small number of students who wanted to present their projects in a science fair, the course came to be a part of the 4-year loop that the teachers in the department generally loathed. It made it almost impossible to ignite dynamic community learning experiences, the hallmark of the science program in grades 9 through 11. However, the group never had a consensus around, or clear vision for, what would replace this senior course were they to propose a change to the school's administration.

As the study progressed, the teachers coalesced around the concept of a senior science course which drew upon the various disciplines within science, but was rooted in social justice and the intentional effort to connect the final year of the science program to the important issues which affect their students and their communities. In the month that followed the study, the department proposed a complete overhaul of the senior science program, which they are calling "Science in Society," and which is rooted in several features of their collective growth throughout the study. For example, the three overarching themes which will serve as the hallmark topics of the course are, "health science, environmental justice, and engineering and technology" (City Charter High School, 2022). Topics addressed in "health science" include racial health inequities, other public health disparities, and more; in "environmental justice," disparities in particulate matter, lead exposure, food deserts, and more; in "engineering and technology," mass incarceration and DNA technology, urban development, and more.

Simply put, the proposed senior science course will marshal all of the prior science learning into a deep, interdisciplinary study of culturally relevant science topics. If accepted by the school's

administration³, it will mark a significant milestone in not just the department's, but the school's evolution as an equitable place of practice. Regardless of whether the course is adopted, the collaboration and energy around designing and proposing this course clearly indicates the impact of this intervention on the department. So in returning to the stated problem of practice this study hoped to explore, "*White teachers struggle to create and implement culturally responsive pedagogy*," this study suggests that, under particular circumstances, White science teachers are indeed able to improve their ability to create and implement culturally responsive science pedagogy.

Culturally responsive pedagogy is arguably the most important aspect of teacher practice with respect to centering and honoring the lives of Black and other marginalized student groups, accelerating student engagement and learning for vulnerable student groups, and effectuating social justice as an urban educator. All barriers to this mode of practice – personal, organizational, systemic – regardless of intent, must be understood as having the effect of upholding the racial disparities which have for so long been characteristic of educational settings in the United States. And while there are clearly a range of other, perhaps larger, structural impediments to a more equitable and just system of education, this project is rooted in the belief that despite the reality of these vast higher-level challenges, teacher practice – day in, and day out – is a crucial front in the struggle for social justice in America.

In this case, for White teachers teaching a mostly-Black student body, exploring and changing how they conceptualize, design, and implement a lesson was an aspect of their practice most within their sphere of influence and thus the most apt place to begin working to change their

³ City Charter High School adopted the proposed class in June of 2022

craft. And even in a school which is largely free of bureaucracy, explicitly concerned with racial inequities in education, and generally supportive of teacher innovation, the barriers to developing and sustaining a commitment to culturally responsive pedagogy were and are substantial.

5.2 Towards a Culturally Responsive Pedagogy Professional Development Model That is Content-Specific

Participants all felt that the intervention supported their growth as culturally responsive urban educators and emphasized the value of concretely exploring this pedagogical approach to teaching in a science-intensive environment. Based on a shared understanding between myself and the group, and as previously described, the intervention began with the acknowledgement that prior efforts to support culturally responsive pedagogy in science had been inadequate in critical ways; trainings and conferences in the past had been too broad and non-specific with respect to discipline, they had assumed that interrupting White privilege and highlighting the negative impacts of racism could offer constructive pathways towards better teaching, or they failed to honestly engage with organizational barriers which prohibit equitable systemic change. Thus, the intensive focus on culturally responsive science pedagogy offered this group of teachers access and reference points which connected their commitment to effective teaching with the philosophical framework they had previously been unable to fully adopt or implement – culturally responsive science education focused on connecting science learning with their Black students’ lives and the struggle for racial justice.

Scholars have noted the need to strengthen STEM-intensive culturally responsive pedagogy in teacher preparation. The findings in this study support these concerns, namely that

Whiteness, writ large, functions as an existential feature of nearly all aspects of STEM teacher preparation; from STEM fields being historically hostile to voices and communities of color, to the lack of prioritization placed on building a robust and diverse teacher pipeline, to the abject failure in preparing White teachers to fully educate students of color in America, to the embrace of racist standardized tests, to the Whitewashing of curricula to erase Black and indigenous science traditions and the history of white supremacy in science, to the ongoing neglect of meaningful culturally responsive professional development in STEM fields (Mensah & Jackson, 2018; Polk & Diver, 2020). In these ways and more, Mensah and Jackson correctly characterize Whiteness as “property” in science teacher education, for as long as the institutional norms in science teacher preparation are rooted in presumptions and preferences which understand STEM fields as fundamentally color-evasive, they will always by default elevate Whiteness, thereby perpetuating racial harm and racial disparities in education (Mcintyre, 2002, Mensah, 2013).

Additionally, another component of building socially-just culturally responsive pedagogy among preservice teachers and teachers in the field is the inclusion of actual community voices in professional learning and curriculum development. Parents and other caregivers’ first-person experiences with the social justice issues in their lives ought to provide an essential perspective for teachers who likely do not live in the communities in which they teach. Academic studies and high-quality journalism are necessary components of building critical consciousness among teachers, yet not to the exclusion of the lived experiences of people in affected communities. While this study did not engage community voices, this remains a vital approach for teacher-leaders and school leaders driving professional development, as the actual experts on life in students’ communities are the students and their fellow community members.

The five White teachers in this study exerted intense efforts to improve their practices and gain some of the skills necessary to initiate a focus on Black student advancement and racial justice. Yet clearly in the context of their practice, what they were working to overcome specifically was not just their personal geographical and cultural distance from communities of color, but the institutional inertia of science teacher preparation as White-normative and color (Brown, 2017; Goode, Johnson & Sundstrom, 2020). These White teachers operating in an urban context, had never been given the professional training to approach a diverse group of marginalized students with historical literacy and a nuanced understanding of how to directly engage the concerns, struggles, and aspirations of their students' communities – and this is a feature, not a glitch, of teacher preparation in America (Harris, Hayes, & Smith, 2020).

5.3 Towards a Culturally Responsive Teaching Professional Development Model That is Practice-Intensive

Given the lack of training and experience with culturally responsive teaching these teachers reported, professional development models should direct their efforts toward improving teachers' ability to actually design and implement culturally responsive teaching in their classrooms. Having spent many hours in a range of workshops and conferences which dealt directly with race, racism, social justice, restorative practices, and even culturally responsive teaching, they had been left to figure out what these concepts mean in practice, and how they ought to integrate them into their relatively traditional preparation as science teachers. As White educators who lacked a broad set of formative educational experiences in Black communities or deep familiarity with Black culture and histories, and in light of the incredible demands of the urban high school at which they

practice, this chasm between the acquisition of knowledge and application of said knowledge proved too large to traverse. This fact reflects one of the many ways traditional teacher training fundamentally fails to prepare educators, but particularly White educators, to not only consider and account for their own positionality before facing students in the classroom but also to give teachers actual practice in specific pedagogies – most notably culturally responsive and social justice pedagogy, which is one vital way classroom practitioners can equitably serve their students.

Specifically for White educators, this focus on practice must be grounded in the study of critical modes of thought, both about one’s own experiences but also about how those experience were shaped by White racial advantage and anti-Black racism historically, and how those dynamics impinge upon their ability to think differently about their respective discipline and their approach to instruction. Having established some foundational critical knowledge about their role as White educators within a specific discipline, teachers must then explore a range of potential access points in their curriculum, where they could interrupt the color-evasive and uncritical status quo by injecting perspectives, voices, and issues which connect with students’ lives and provoke a shift in consciousness for students. Once an access point has been identified, teachers must put their learning into practice and revise an existing lesson or create an entirely new lesson which captures this emergent philosophical growth – the example provided in this study could possibly be the shift from “teaching science” to “teaching science in a way that addresses issues which primarily impact Black students.”

Having planned this lesson, teachers must then implement the lesson with students and actually experience what it is like to make their science class into a “science class with a social justice conscience.” Finally, having executed the lesson, teachers must reflect upon the experience and consider all of the relevant instructional variables; introduction, framing, language and

vocabulary, objectives, processes, conclusion and evaluation of learning. Equally as important is the need for teachers to reflect upon their own experience with teaching a culturally responsive lesson – particularly a lesson which addresses race and racial justice directly: How did they feel? Why did they feel this way? How did the students seem to feel and react? What was the “energy” like in the room? How was it different teaching this concept using culturally responsive content versus content which is not?

This small study shows that when White teachers are in a supportive professional learning community, are committed to critical pedagogical growth, and are given the chance to practice - design, implement, and reflect upon - culturally responsive teaching they are capable of real pedagogical growth in their classroom practices. The teachers acquired not just knowledge about these ideas, but practice employing them, thereby improving their confidence and affirming the educational value of continuing the pursuit of these practices. The real-life implementation of and reflection upon these experiences did, in fact, allow this group of White educators to move from “culturally responsive theory to practice,” and ensured that this shift in pedagogy would be more durable than it had been based on years of non-practice based workshops and training. This conclusion should not be misunderstood to disparage or diminish the absolutely essential role of theoretical and philosophical training in education; as a bastion within the struggle for a more democratic and just society, educational thought must be engaged in every mode of critical intellectual discourse. Rather this paper hopes to highlight a segment within the huge range of people who work in education – classroom teachers – and identify an opportunity to strengthen the connection between theory and praxis.

These findings are consistent with a wide range of prior research on culturally responsive professional development which identifies practical implementation and practice as critical

components of meaningfully impacting teacher practice. “Making theory into practice” is a recurrent theme across a range of K-12 contexts focusing on increasing equitable teacher practice, specifically for White STEM educators, each of which emphasized the need for understanding theory while also imploring teacher training programs and professional development programs to insist on bringing the acquired theoretical understandings directly to the realm of real-world classroom practice and curriculum design (Suriel & Atwater, 2012; Mensah, 2013; Powell, Cantrell, Malo-Juvera & Correll, 2016;

5.4 Toward a Culturally Responsive Teacher Pipeline

This study was focused on a diverse, yet mostly-Black urban high school with a nearly all White teaching staff. And while the participants in this study made every indication that they were committed to equitable professional growth through culturally responsive social justice science teaching, these teachers remain an outlier in an increasingly-White profession. While the benefits of building a robustly diverse teacher workforce may seem self-evident, it is worth highlighting that evidence suggests Black teachers are less likely to unnecessarily impose disciplinary actions against Black students, Black students are also more likely to grow academically, and also to report equitable treatment (Butler-Barnes, Inniss-Thompson, 2020; Edwards, Terry, Bingham & Singer, 2021; Gershenson, Hart, Lindsay & Papageorge, 2021). Some of these findings are jarring and ought to serve as a “call to arms” to build a diverse teacher workforce in America, with one example being that Black students across two states who were assigned a single Black teacher in grades 3-5 were less likely to drop out and more likely to attend college (2021).

If White teachers are not trained and prepared to take seriously the charge of educating Black students through their pedagogy and practice, and Black teachers are more likely to do so and do so well, then having teachers of similar backgrounds to said marginalized students could be one bulwark against the broader, systemic problem of racial and cultural disconnect between teachers and students – and it is less likely that culturally responsive teaching would remain an obscure pedagogy if a broader swath of the teacher labor force had greater proximity to the actual lives students of color. Put bluntly, even the White teachers most committed to equity and justice likely have to overcome years of White cultural conditioning, acquire a strong set of Black historical knowledge, and develop a yearning to understand the social justice issues in Black communities – and work in a context where they are supported in transferring these learnings into curriculum design and classroom instruction; Black teachers are simply much less likely to face comparable obstacles on their journey to becoming high-impact culturally responsive teachers. Representation matters in teacher demographics in all schools, yet the stakes are higher where marginalized and oppressed students are concerned.

And the need to build a diverse and critically conscious teacher pipeline could not be more urgent. At the time of this publication, the state of Pennsylvania just reported a 66% drop in new teacher certifications state-wide (Goldstein, 2022). Coupled with the staggering fact that 94% of K-12 teachers in the state are currently White, these demographic trends pose an existential threat to marginalized students, specifically Black students in Pennsylvania. So while at a the school-level, this study provides a strong framework for helping White teachers move from understanding culturally responsive pedagogy as a theory to creating and implementing culturally responsive lessons with real students, it should not be interpreted as a deflection or minimization of the broader structural forms of harm which have defined public education for generations and continue

to threaten the lives and futures of Black students. This shrinking and Whitening workforce must be highly-trained in critical pedagogies, prepared to teach for social justice, and develop the skills necessary to center the lives of their marginalized students in ways meaningful to instruction. Efforts to prepare teachers for effective culturally responsive practice, along with nearly every other essential function served by public schools which serve vulnerable student populations, is placed in grave peril in the midst of a massive contraction of the teacher workforce and pipeline.

Lastly, yet crucially, efforts to diversify and increase the teacher pipeline should be understood as necessary but not sufficient conditions in the broader effort to mainstream culturally responsive social justice pedagogy. For even if there is a massive influx in teachers, and even teachers of color, many of them could likely still be trained and educated in color-evasive, standardized test-driven, uncritical pedagogical practices. This study recommends a deeper restructuring of teachers' relationships with knowledge, communities, and also the ethical and social responsibilities that accompany the deep inequities and stratification which impact students across this country. Teachers must be trained to be reflective about their own knowledge assumptions and their own commitments to social change, equity, justice. For too long, teaching has served the interests of every constituency *but* our most marginalized communities; teacher preparation and recruitment initiatives must be transparent about these commitments and attract a diverse field of potential teachers who are expressly committed to justice and equity in education.

5.5 Limitations

This intervention yielded important positive results for the participants and will likely produce a lasting positive impact for the students themselves for years to come. However, this

place of practice – the unique characteristics which sets it apart as a high-functioning urban charter school – has features that would likely present some limitations for practitioners seeking to replicate this study. With no district-mandated curriculum, teachers have an incredibly high degree of autonomy. Over the past several years, the school’s leadership has become more explicitly focused on equity issues both in academics and discipline, and have created an environment where teachers are afforded the opportunity to think and teach critically. As a looping school, nearly all teachers within departments teach every aspect of the scope and sequence, thus every member has a personal stake in each aspect of the entire curriculum.

Furthermore, having attended a range of trainings on equity-related issues, every member of this department was eager to advance their practice as culturally-responsive educators – there was no prior condition of resistance or conflict within the department to overcome. And perhaps this is the most unique feature of the department; there was no opposition in principal to culturally responsive pedagogy and racial justice, but rather their reluctance lied in the fact that they were ill-equipped and unprepared to explore this terrain without a facilitator and without the expressed support of the administration. Lastly, my role as a facilitator was bolstered by the strong and trusting relationships I have with the participants as a colleague.

Yet despite these limitations and particularities of the context in which the study was conducted, this intervention touched on a range of universal themes across American educational contexts. And if no other school is able to adopt this precise model of professional development and sustained commitment to culturally responsive practice, hundreds of City High students’ lives and educations stand to be positively impacted in the coming years by the teachers who participated in this research.

5.6 Conclusion

These teachers' willingness to be vulnerable and honestly account for what they lacked in lived experience and pedagogical training as White urban educators tells a powerful story about the human capacity for empathy, reflection, the courage to grow, and to struggle for justice – essential components of any high impact critical teacher. The incomparable James Baldwin, one of the greatest intellectuals in American history, articulated some of the most fundamental truths about race and racism in American life – in the American ethos, in fact. In a short letter he wrote to his nephew, which would later be expanded into his magisterial short book *The Fire Next Time*, he described for his nephew what he thought to be the appropriate frame through which to think about White people at the time. And while 60 years have passed and much has changed in American life, many of the same injustices and crises persist. The truth of his insights capture something fundamental, something which lies at the bedrock of our circumstances as White people in this society, something which has perhaps even greater poignancy for those of us White people who teach in schools which serve Black students. He tells his nephew:

...[White people] are, in effect, still trapped in a history which they do not understand; and until they understand it, they cannot be released from it...Many of them, indeed, know better, but, as you will discover, people find it very difficult to act on what they know...But these men are your brothers—your lost, younger brothers...we, with love, shall force our brothers to see themselves as they are, to cease fleeing from reality and begin to change it (Baldwin, 1962).

In some of the most incisive ethical and social commentary ever written, Baldwin communicates essential wisdom for people engaged in the struggle for the humanity and equality of all oppressed people. He acknowledges both the vicious tidal forces of history – a history so

vast it can seem omnipotent – while also acknowledging the humanity and potential of those individuals who, by dint of their own privilege and credulity, often know not the roles they play in these systems, nor even that these systems exist. He declares that, with love, these people – these White people – are capable of seeing themselves as they are, facing reality, and changing it.

I believe that the teachers in this study embody some of the spirit of Baldwin’s eternal wisdom. They did not pick their parents, where they grew up, or the culture which shaped their worldviews. They were not educated about Whiteness and racism, nor taught to see the countless ways Whiteness shaped the contours of so much of their life trajectories. Upon going to college to become teachers, they did not set out on a mission to “serve Black communities.” Yet they find themselves at a mid-size urban high school in the exact center of a mid-size American city, serving a mostly Black and multiracial, low-income student body. And through a range of professional experiences and countless interactions with their Black students, they came to understand that they had not been utilizing the most powerful pedagogical resource available - the lived experiences and concerns of their Black students – and ultimately, they decided to act. They began working to see themselves in a new light. They dropped pretense that they had their roles as urban educators “figured out.” They set out to change their pedagogy and practice to not just help students understand their reality, but to change it.

This experience marked the beginning of what I believe will be a longer and deeper evolution of consciousness and craft for these teachers. It is my hope that this study offers both a *critical* description of the machinery of systemic Whiteness in education, and also a *hopeful* description of one way Whiteness can be confronted at the individual level so that the machinery – or at least some tiny part of the machinery – can be dismantled.

Appendix A City High Academic Performance Data⁴

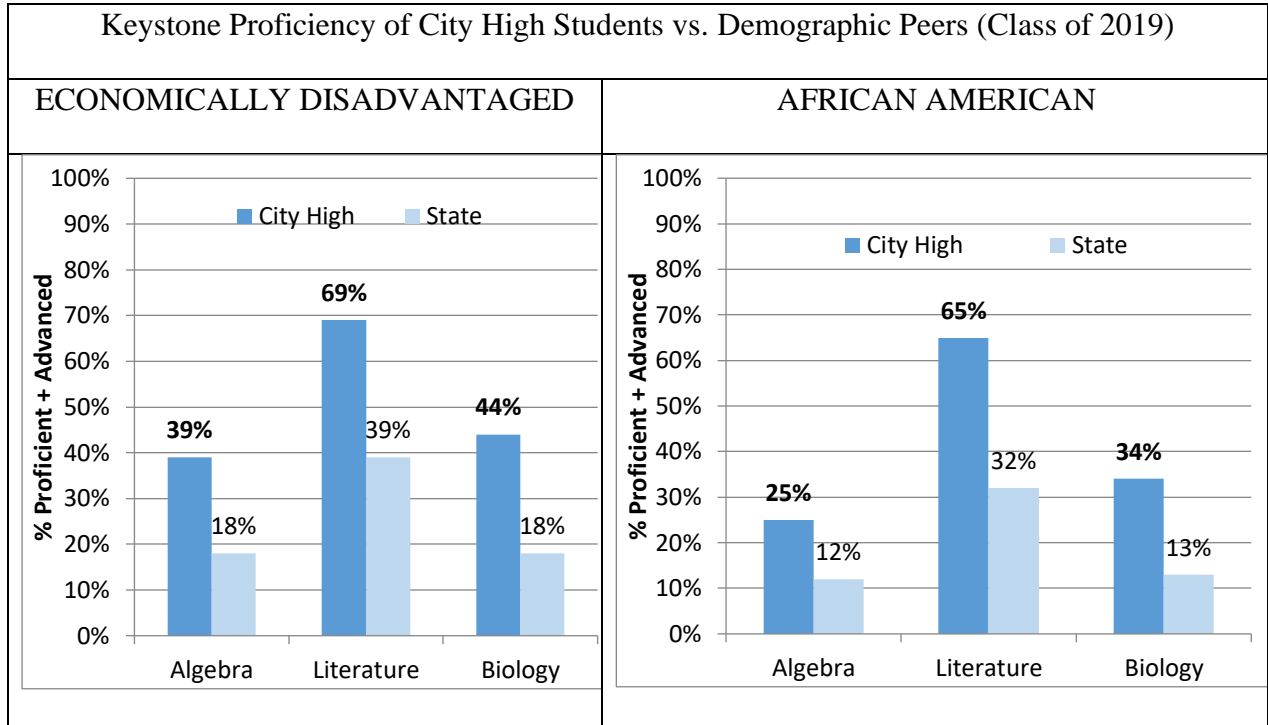


Figure 1. Proficiency Scores

⁴ Data in Appendix A provided by Dr. Catherine Nelson, data consultant to City Charter High Schools since 2002

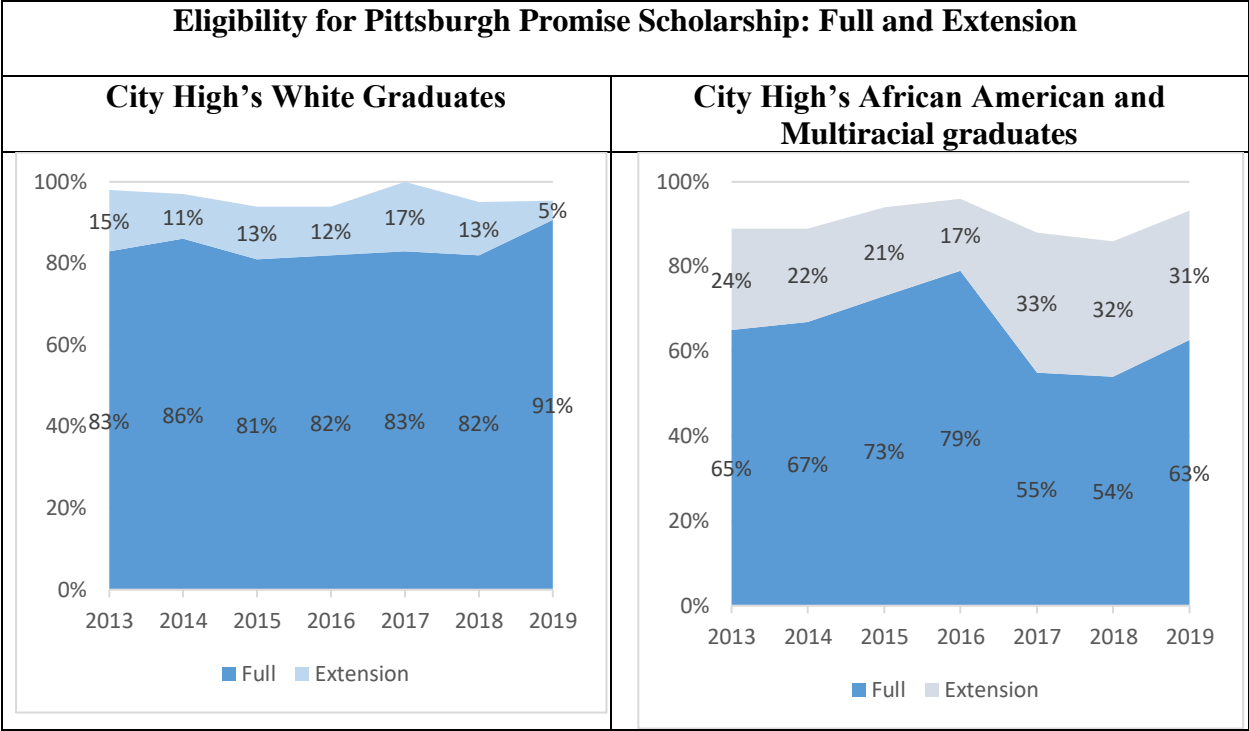


Figure 2. Pittsburgh Promise Scholarship Eligibility

City High Performance on State Growth Expectations: 2017-18				
	All students	African American	Economically Disadvantaged	Special Education
English	Exceeded	Exceeded	Exceeded	Met
Math	Met	Did not meet	Met	Met
Science	Exceeded	Exceeded	Exceeded	Exceeded

Figure 3. State Growth Expectations

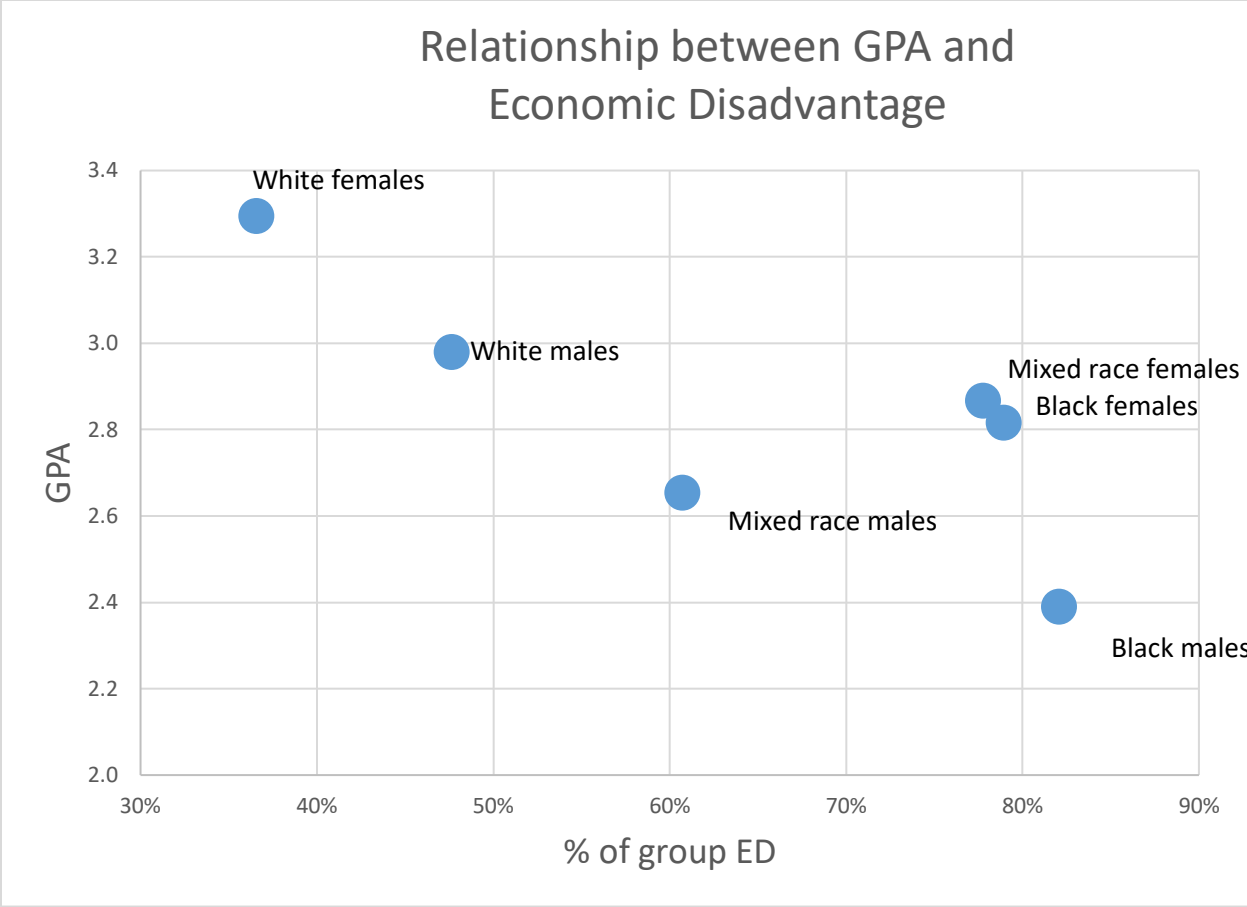


Figure 4. GPA and Economic Disadvantage

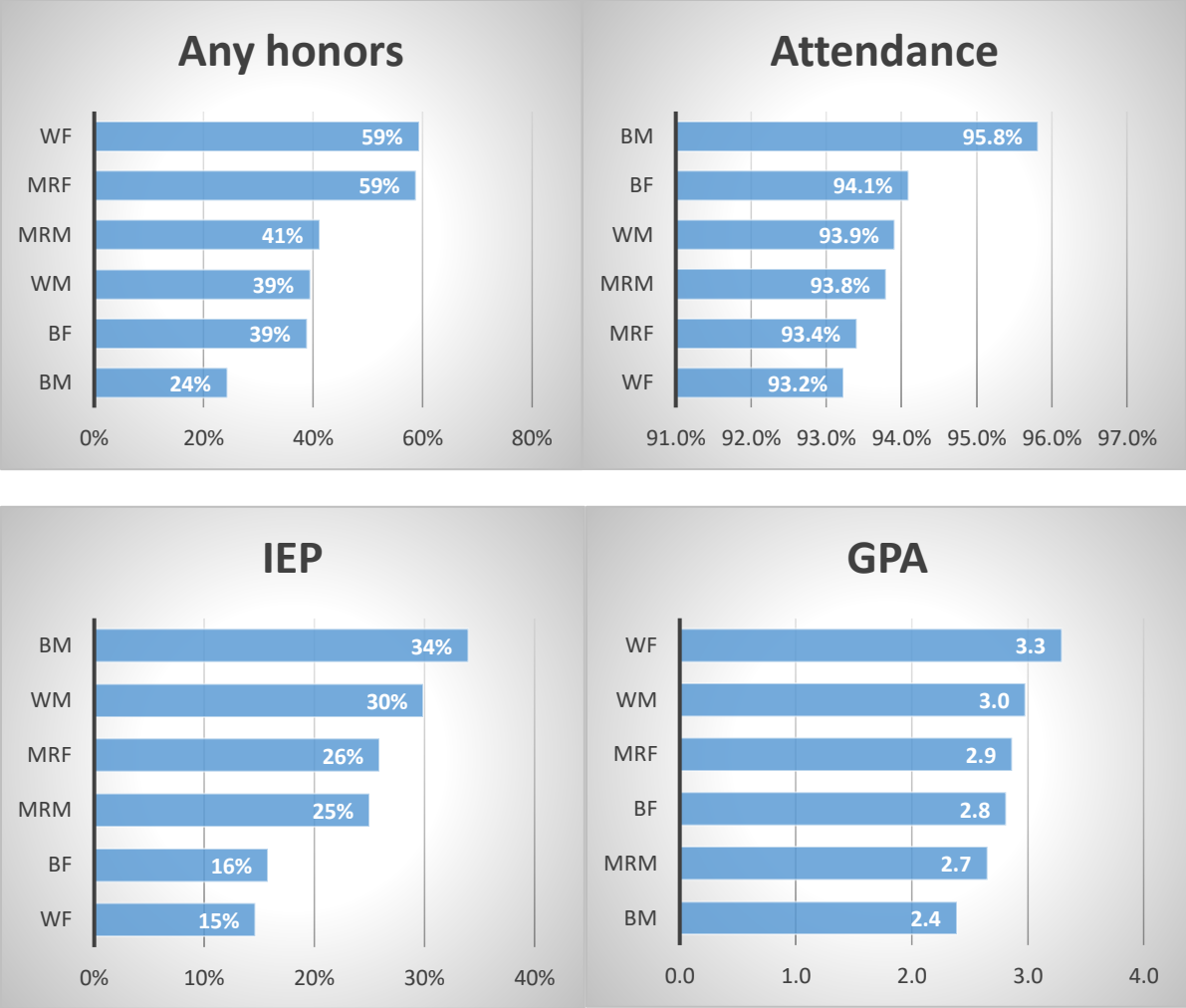


Figure 5. Academic Information by Demographic

Appendix B City Charter High School - Equity Policy

City Charter High School defines **EQUITY** as the principle that all students, regardless of their identity or background, deserve high quality, rigorous, and academically challenging educational opportunities that facilitate postsecondary and career success and foster a strong sense of self-efficacy. In practice, this means that all educational opportunities will reflect the diversity of the student population, affirm each student's individual identity, and provide students with an education that is responsive to their lived experiences. City Charter High School acknowledges the inequalities that exist in our society, and commits to the elimination of any institutional barriers that perpetuate inequality or serve to marginalize or exclude students from ethnic, racial, gender, or socio-economic groups that have been traditionally underrepresented and underserved. To this end, City Charter High School will employ the full spectrum of resources, services, and supports that maximize all students' opportunity for success.

The goals are to...

WELCOME students to an environment that provides a sense of community, a feeling of belonging, and validation of their identities, with a particular focus on students from marginalized groups

NURTURE students' physical, emotional, cultural, and educational well-being through all programs and services within our institution

UPHOLD the principles and practices of Equity in every aspect of our institution.

Therefore, City Charter High School strives to...

SUPPORT faculty through a learning community model: faculty and staff will be provided with myriad resources, including but not limited to, strategic planning from administration, outside expertise on issues related to Equity, and various forms of professional development and collaboration on Equity-related issues. City Charter High School commits to pursuing additional resources that ensure a holistic understanding, awareness, and sensitivity to the multiple facets of

student identity including: race, ethnicity, socioeconomic status, religion, gender, sexual orientation, immigration status, and other personal identities that impact school life.

Appendix C Fishbone Diagram of Problem of Practice

City Charter High School

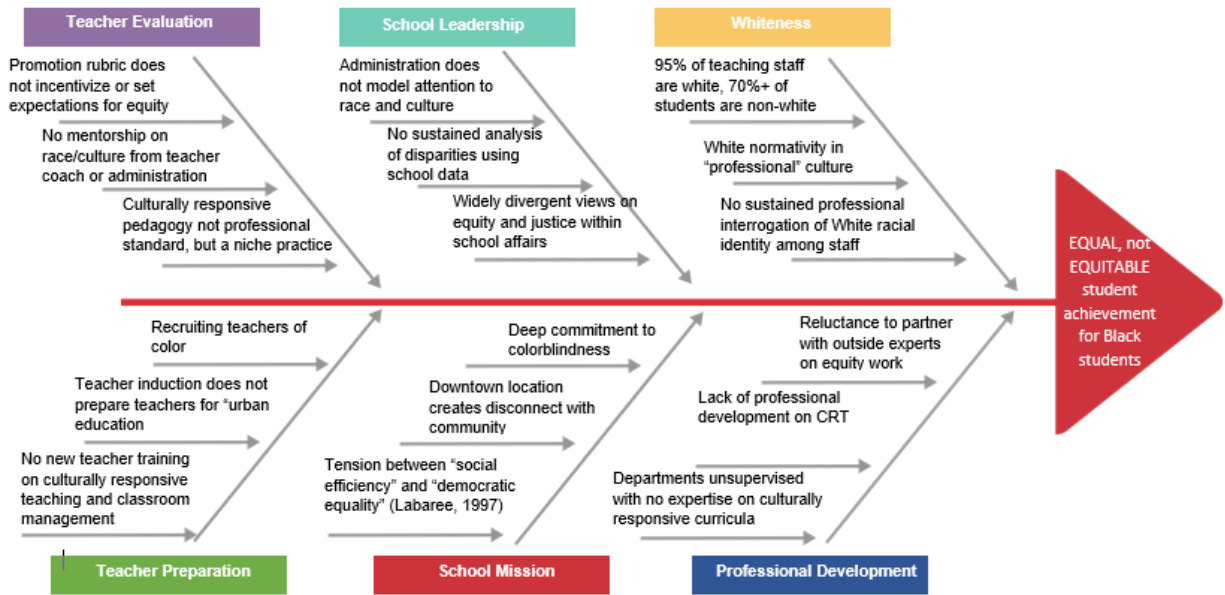


Figure 6. Fishbone Diagram

Appendix D Driver Diagram

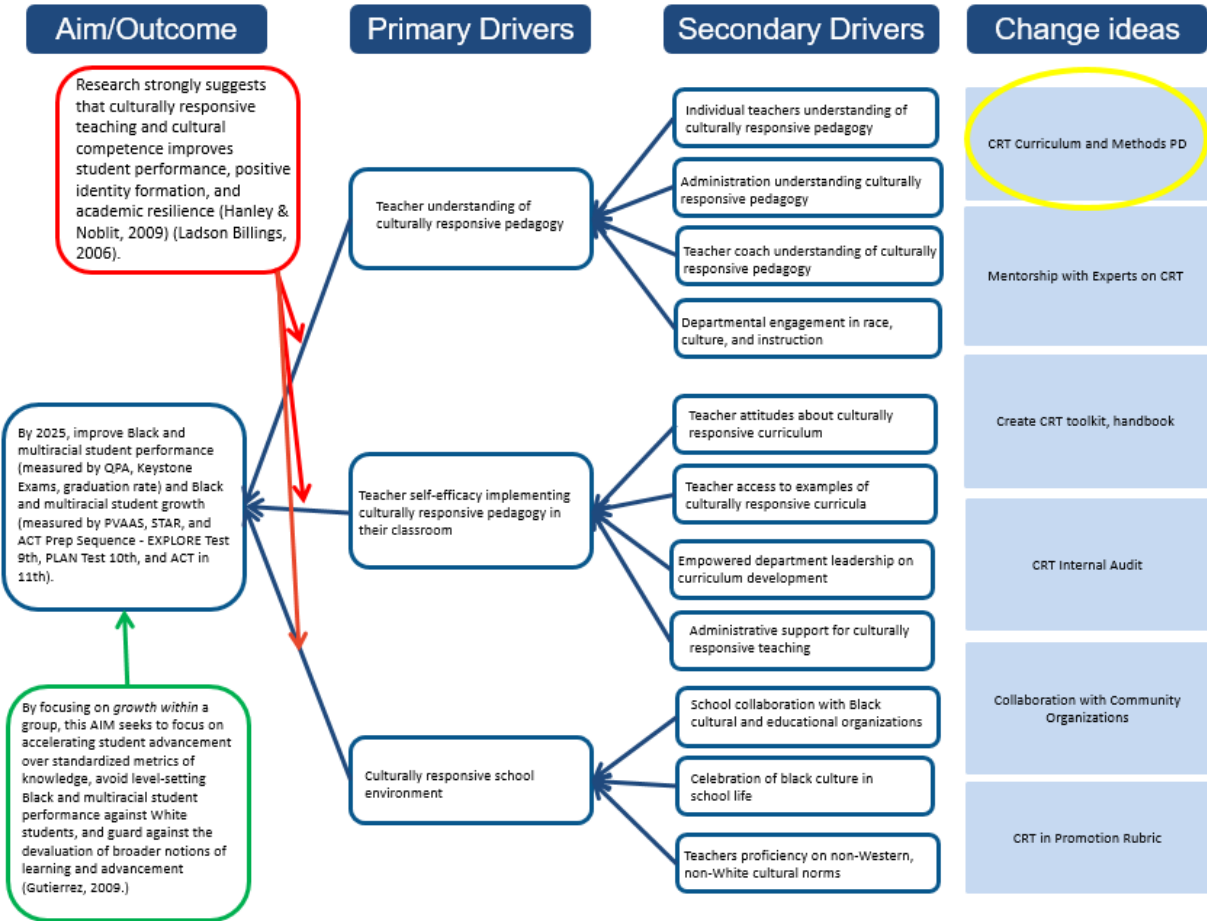


Figure 7. Driver Diagram

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