**COMPULSORY HETERONORMATIVITY AND THE GENDERED DIVIDE IN SECONDARY M ATHEMATICS EDUCATION**

Vanderbilt University – Peabody College

Capstone

Jake Harbin

**Abstract**

There has been considerable published research concerning the marginalized experiences of racial minorities and women in the fields of science, technology, engineering, and mathematics (STEM). However, the experiences of individuals that identify as lesbian, gay, bisexual, or transgender remain unclear. Given the current status of the gendered, male-oriented divide of standardized assessment performance in secondary mathematics, this creates a heteronormative climate that limits academic opportunities for queer and non-gender conforming youth. To disrupt the highly-masculinized representation of STEM disciplines and to foster more gender-inclusive practices in secondary mathematics education, this Capstone will analyze secondary mathematics classroom practices from an intersectional perspective of gender, race, sexuality, and gender identity. This Capstone will explore classroom design solutions to promote systemically equitable outcomes in mathematically-intensive disciplines for LGBTQ+ students.

I will focus on developing pedagogical design solutions that minimize masculinized competition in secondary mathematics classrooms that only accommodate the success of white, heterosexual males. This Capstone will address the influence of neoliberalism that infiltrates the public education system and the hierarchical structures of power based on gender, race, gender identity, and sexuality that facilitate achievement disparities for queer and non-gender conforming youth in mathematics. I will use this theoretical perspective of gendered power dynamics to generate a foundational model of mathematics classroom methodology that accounts for the institutionalized masculinity of the current secondary mathematics curriculum. In the gender-inclusive classroom models that I put forth, the social construct of the gender binary will no longer be used as a reference for evaluating gender disparities in mathematics academic achievement. As a result, this Capstone aims to provide insight and pedagogical recommendations to redress compulsory heteronormativity in secondary mathematics classrooms by proposing cultural competency training for teachers and amendments to mathematics curriculum and assessments that can eliminate biases based on sexuality and rigid definitions of gender.

**Key Terms**

To establish the conceptual framework, I will begin by defining the following key terms that represent the foundation of the central themes and arguments of this Capstone: *neoliberalism*, *gender binary*, *compulsory heteronormativity*, and *intersectionality theory*.

 *Neoliberalism* is a right-wing school of thought that refers to the ideas and social policies that favor economic liberalism and free-market capitalism. This involves government deregulation of corporations, privatization of public goods and services, and reductions in government spending. Neoliberalism is the foundation of the romantic ideal of the “American Dream”, which ignores power dynamics based on race, gender, sexuality, and socioeconomic status that limit opportunities of economic success for minoritized, underprivileged populations. The neoliberal concept that every United States citizen has an equal opportunity to succeed perpetuates systemic social inequality. The strict adherence to the principles of neoliberalism in American society directly affects the public education system by creating policies and academic standards that only accommodate privileged white, heterosexual male students. The detrimental effects of neoliberalism are clearly demonstrated by the gendered divide in K-12 mathematics assessment performance (Apple, 2006).

 The *gender binary* is a gender classification system that only recognizes two distinct and completely opposite genders: male and female. The gender binary system assumes that every individual’s gender identity aligns with his or her biological gender label that was assigned at birth simply based on the shape of genitalia. The Eurocentric prevalence of Christianity in the United States and the authoritative standards of the Christian Bible establish gender roles that only associate masculinity with the male gender and femininity with the female gender. The gender binary is a social construct that dictates gender norms in our society and perpetuates systemic inequality for the LGBTQ+ community. By assuming that the duality of male and female characteristics is natural, this has implications that severely limit opportunities of success for homosexual, bisexual, transgender, gender-fluid, and non-gender conforming individuals due to discrimination. The gender binary is the foundation of heterosexual male privilege in American society (Ahmed, 2006).

 *Compulsory heteronormativity* is supported by the concept of the gender binary and is a belief that divides all humans into two distinct and completely opposite genders of male and female. Additionally, compulsory heteronormativity assumes that heterosexuality is the only sexual orientation, which establishes norms of solely heterosexual marital relations. As a result, compulsory heteronormativity consolidates biological gender, gender identity, and sexuality into two rigid definitions that correspond to the “masculine” man and “feminine” woman. Unfortunately, heteronormativity is a widespread and privileged belief system in the United States that contributes to systemic social inequality for the queer community. Ascribing to the “morality” of heteronormative beliefs, as defined by privileged white standards of Christianity, justifies homophobic and transphobic discriminatory practices that severely limit opportunities for academic and economic success for the LGBTQ+ population in the United States. Although compulsory heteronormativity can be easily associated with overt practices of homophobia, the overarching influence of heteronormativity also contributes to indirect practices of homophobia and transphobia that are “hidden” and embedded within policies that dictate academic assessment standards and K-12 mathematics classroom practices (Butler, 2004).

 *Intersectionality theory* is a framework that identifies the interconnectivity of power dynamics that marginalize minoritized populations based on race, gender, sexuality, gender identity, and socioeconomic status. Intersectionality theory does not view each of these classifications of social stratification as separate entities. Instead, this theory emphasizes that all forms of discrimination are directly related and contribute to hierarchical structures of power that dictate societal norms and result in white, heterosexual male dominance. Due to the foundations of neoliberalism and the concept of the “American Dream”, the predominant belief that we now live in a post-racial and post-feminist society perpetuates both systemic racism and systemic sexism. Based on the claims of intersectionality theory, the misconception of a post-racial and post-feminist society by the neoliberal school of thought also implies a common misconception of a society that no longer marginalizes queer individuals, which also perpetuates systemic discrimination based on sexuality and biologically non-conforming gender identity. Due to the intersectionality of race and sexuality, the concept that white racial “colorblindness” contributes to systemic racism can be paralleled to the idea that heterosexual “blindness” with respect to queer individuals contributes to systemic discrimination based on sexuality (Ladson-Billings & Tate, 1995).

**Conceptual/Theoretical Framework**

Intersectionality theory demonstrates that neoliberalism and capitalism contribute to a highly competitive and male-oriented environment in secondary mathematics classrooms and mathematically-intensive disciplines (Leyva, 2017). Intersectionality theory recognizes race, gender, and sexuality as socially constructed concepts that mutually perpetuate marginalization and facilitate an interconnected framework of multiple systems of oppression (Collins, 1993). Because neoliberalism endorses free-market, competitive capitalism as the ultimate representation of economic liberty and the embodiment of democracy, it ignores racial and gender disparities in American society based on the widely accepted idea that equal economic opportunity already exists. Neoliberalism assumes that we live in a post-racial and post-feminist society, which further stratifies minoritized populations. Capitalism operates on a platform of economic competition that inherently creates hierarchical structures of power based on historical white male dominance, which preserves and justifies racial and gender discrimination as social norms. The false claims of liberty and democracy by the economically privileged members of society create barriers to success for minoritized populations due to heavily disproportionate wealth distribution and lack of access to resources.

 As a microcosm that reflects the systemic framework of intersectional oppression in American society, neoliberal ideas infiltrate the K-12 public education system and contribute to academic standards that are rooted in “colorblind” perspectives of whiteness. These academic standards facilitate Western, Eurocentric standards of intelligence that automatically and solely support the academic success of students that originate from racially and socioeconomically privileged backgrounds. This creates a hierarchical ranking system of “smartness” that intersects with the ideologies of whiteness that consistently marginalize females and students of color. This ranking system conceptualizes secondary mathematics classrooms as racialized and gendered spaces with highly masculinized and Eurocentric perceptions of intelligence. Due to the interconnectivity of all systems of oppression, the hierarchy of academic achievement in mathematics also affects queer and non-gender conforming youth. Based on the dominant ideologies of whiteness and “smartness”, intelligence and academic success are viewed via a lens of masculinity that severely limits the expression of authentic identities for queer youth, racially minoritized youth, and females (McGee & Martin, 2011).

 Examining American society via a lens of critical bifocality, the macro-level structural dynamics of globalization, technological supremacy, and the desire for economic power in the U.S. preserves the dominance of white males in mathematically-intensive disciplines (Weis & Fine, 2012). Due to the intersectionality of marginalization based on race, gender, social class, sexuality, and gender identity, the overarching influence of neoliberalism limits opportunities for academic achievement in mathematics for queer youth. Because the secondary mathematics curriculum aligns with the dominant ideologies of whiteness and its association with male privilege, the learning context, curriculum, and assessment lack cultural relevancy for queer youth in mathematics classrooms. In order to be academically successful in mathematics, queer youth are often expected to conform to standards of masculinity that adhere to the rigid heteronormative definitions of gender as strictly male and female.

The prevalent misconception that males are naturally better than females in mathematics due to the consistent superior performance of males on standardized assessments contributes to a “difference as deficit” view of students that deviate from stereotypically “masculine” behavior that is associated with successful performance in mathematics (Leyva, 2017). Secondary mathematics educators often unintentionally hold these deficit beliefs that males with “masculine” behavior and characteristics will outperform other students, which automatically lowers expectations for queer youth and females. As a result, the act of doing mathematics and solving mathematics problems based on current curriculum standards equates to “doing masculinity” (Leyva, 2017). Due to the desire for technological supremacy and global economic domination in the US, success in mathematics is inherently associated with the leverage of power and financial superiority in mathematically-intensive careers, such as engineering (Apple, 2006). This correlates with a highly masculinized secondary mathematics curriculum that excludes the participation of queer youth. This essence of masculine intelligence fosters a highly competitive environment in secondary mathematics classrooms that leads to negative internalizations of mathematical ability and dissuades queer youth from pursuing careers in science, technology, engineering, and mathematics (Connell, 2010). Queer youth and females are often stereotypically associated with natural “success” in the humanities and liberal arts and are automatically expected to underperform in mathematics with default deficit perspectives.

The neoliberal masculinization of mathematics that originates from the secondary mathematics curriculum further contributes to gender and sexuality disparities in mathematically-intensive undergraduate degree programs, as well as STEM careers. For example, qualitative research has shown that LGBTQ+ youth in post-secondary mathematics and engineering programs experience academic and social isolation, feeling the need to “downplay” cultural characteristics associated with LGBTQ+ identities. This leads to emotional and psychological distress that creates a hostile environment for queer youth in relation to their heterosexual peers. The gendered segregation of these programs originates from neoliberalism’s glorification of masculinity and secondary mathematics classroom environments that reflect the association of Eurocentric, Western mathematics with the expression of male-oriented, heteronormative characteristics.

A 2016 qualitative research study that administered a survey examining the experiences of LGBTQ+ individuals in the STEM workplace found that these individuals often feel the need to suppress or hide their queer identities to be successful (Yoder & Mattheis, 2016).The prevalent heteronormative assumptions that dictate gender identity and gender expression in the STEM workplace cause queer individuals to feel invisible and excluded from the community of intellectual superiority that is cultivated by heterosexual peers (Bilimoria & Stewart, 2009). In the masculinized environments of mathematically-intensive workplaces, heterosexual male employees can express themselves genuinely and freely without judgment or deficit labeling, while LGBTQ+ employees must balance a fine line of “code switching” between heteronormative behavioral conformity and their genuine queer identities (Bilimoria & Stewart, 2009). These experiences in the STEM workplace reflect the experiences of queer youth in secondary mathematics classrooms (Mizzi, 2013). Queer youth are rendered invisible and internalize deficit labeling that diminishes interest in participation in the mathematics curriculum (Clair, Beatty, & Maclean, 2005). The current secondary mathematics curriculum and common classroom practices fail to embody gender inclusivity and do not acknowledge identities of gender beyond the rigid definitions established by the gender binary. The following analytic argument will explore possible pedagogical design solutions for secondary mathematics classroom methodology and curriculum that minimize masculinized competition, redress compulsory heteronormativity, and promote gender inclusivity for queer youth.

**Analytic Argument: Pedagogical Design Solutions**

*Analyzing Perspectives of the Learner: Queer Youth in Secondary Mathematics Classrooms*

 Qualitative ethnographic research has shown that males and females engage with activities and instruction in secondary mathematics classrooms with different approaches (Boaler, 2002a). A 3-year ethnographic research study of two public high schools in England (structured similarly to US public schools) compared the experiences of male and female students in two distinct mathematics classroom settings (Mendick, 2003). The first classroom setting utilized traditional, straightforward teaching methods that focused solely on procedures with the main goal of getting the correct answer. This classroom setting did not emphasize conceptual understanding and prioritized memorization. In this setting, the study observed that males had positive experiences with the classroom activities, while females struggled without conceptual understanding. The second classroom setting utilized project-based learning with discussion-based activities that promoted student dialogue and exploration of mathematical concepts. In this setting, the study observed that females had positive experiences and struggled less than the first setting. As a result, the study concluded that females tend to have a greater desire than males to understand mathematics conceptually (Brandon, Newton, & Hammond, 1987). The females struggled with the first traditional classroom setting due to the lack of access to understanding “why” the correct answers were correct (Boaler, 2002a).

This emphasis on procedural understanding in the first classroom setting mirrors the vast majority of secondary mathematics classrooms in US public schools, which leads to males statistically outperforming females on standardized assessments. The systemic expectations for students in US secondary mathematics classrooms embodies procedural memorization and getting the correct answer. This emphasis on the importance of obtaining the correct answer without conceptual understanding aligns with the dominant ideologies of whiteness and “smartness”. Getting the correct answer correlates with success in mathematics based on the nature and structure of secondary mathematics standards and assessments. If the learners are unable to obtain the correct answer, then all other mathematical thought is deemed worthless.

 Based on the key concepts of intersectionality theory and the interconnectivity of systems of marginalization, the stratification of females in traditional mathematics classroom settings correlates with the stratification of LGBTQ+ youth in these classroom settings. The sex-based differences in learning styles imply that queer youth positively engage with mathematics instruction that is open-ended, discussion-based, and minimizes direct instruction (Boaler, 2002b). White males have consistently demonstrated superior performance with traditional, procedural mathematics instruction that celebrates the ideology of “smartness”, which defines “success” solely as getting the correct answer (Hanna, 1989). This traditional style of direct instruction facilitates an environment of masculinized competition, embodying the predominant neoliberal ideology that creates hierarchical individual rankings based on quantitative evaluations of performance.

 To promote equitable performance outcomes and enhanced participation for queer youth in secondary mathematics classrooms, these learners should engage in project-based and discussion-based activities that facilitate student dialogue. The mathematics instruction should develop a pathway that leads to self-guided conceptual understanding with minimal emphasis on direct, authoritative instruction. Because queer youth continually experience significant marginalization and discrimination beyond the realm of the classroom in contrast to their heterosexual peers, commanding direct instruction reflects the heteronormative hierarchical structures of power in society, which lead to negative internalizations about mathematical ability for the LGBTQ+ learners in these settings (Mizzi, 2013).

 In creating new pedagogical designs and methods to facilitate gender inclusivity for queer learners in secondary mathematics classrooms, discussion-based and reform-oriented mathematics instruction should actively raise awareness of student identities, relating the context of the content in the mathematics activities to the context of the lives of LGBTQ+ learners (Boaler, 2002b). Research has shown that LGBTQ+ students are less likely to complete upper-level high school mathematics courses than their heterosexual counterparts, and mathematics teachers can play a key role in eliminating this trend by developing engaging mathematics curriculum that relates to the lives of LGBTQ+ students (Riegle-Crumb, 2006). For example, similar to the development of statistics lessons that raise awareness of housing discrimination for racially minoritized youth, mathematics educators can develop project-based statistics instruction that explores the human population’s individual usage of various pronouns with student-created surveys. This project clarifies the distinction between gender identity and biological sex (as defined by the gender binary). In addition to raising awareness of individual identities for LGBTQ+ students, this type of project-based instruction raises awareness of the issues facing the LGBTQ+ community for heterosexual counterparts. Relating mathematics instruction to the lives of marginalized queer students empowers these learners to enact social change and embodies democratic classroom practices that allow queer youth to begin to make progress toward liberating themselves from the systemic effects of compulsory heteronormativity in mathematics.

*Analyzing the Learning Context: Interactions between Teachers and LGBTQ+ Students*

 Research studies that involve observations of interactions between students and teachers in secondary mathematics classrooms have consistently demonstrated that mathematics teachers, specifically female teachers, initiate conversations with and provide direct academic support for male students more frequently than female students (Glasser & Smith, 2008). Generally, mathematics teachers preferentially interact with male students due to the stereotypical, widely accepted notion that males are superior to females in mathematics performance (Forgasz, Leder, & Barkatsas, 1998). majority of secondary mathematics teachers unintentionally hold deficit perspectives regarding female mathematics performance and automatically have lower expectations for students that do not demonstrate masculine qualities associated with the standards of “smartness” established by neoliberalism (McGee & Martin, 2011). As a result, these teachers invest disproportionately less time in students that deviate from the heteronormative standards of masculinity.

 Based on the framework of intersectionality theory and the interconnectivity of the social stratification of both females and queer youth, secondary mathematics teachers frequently overlook queer youth in their classrooms and diminish opportunities for their participation with favored treatment of male students that align with the heteronormative assumptions of masculine characteristics (Forgasz, 1998). This gendered treatment of students silences the voices of LGBTQ+ and female students and disengages their participation in mathematical discourse (Butler, 2004). This leads to negative internalizations about mathematical ability, and non-masculine characteristics are ultimately viewed as academic disabilities by teachers that act as permanent barriers to “success” that embodies masculinized perceptions of mathematical intelligence (Pallas & Alexander, 1983). Mathematics teachers are the “gatekeepers” of their students’ success, and automatic assumptions about mathematical ability based on the gendered norms of the dominant ideologies of masculinity, whiteness, and “smartness” perpetuate the systemic issue of heterosexism in mathematics education (Boaler, 2002a).

 Pertaining to designing new pedagogical methods that enhance the gender-inclusivity of teacher interactions with queer youth in secondary mathematics classrooms, teachers can balance classroom discourse between queer students and their heterosexual counterparts by intentionally by acquiring specific information about each student’s identity pertaining to sexuality and gender identity. Distributing surveys and questionnaires at the beginning of the academic year that ask for student demographic information aid these teachers in recognizing and acknowledging the identities of their students. The intent of improving classroom engagement, facilitating demographically balanced participation, and supporting each student’s success in mathematics should be explicitly stated by the teachers while administering these surveys. Raising teacher awareness of individual student identities increases teacher ability to organize and to deliver mathematics instruction that deliberately includes the engagement of queer youth that are frequently rendered invisible without critical pedagogy.

 In relation to the perspectives of LGBTQ+ learners in the secondary mathematics classroom setting, teachers should authentically tailor instruction and discussion-based activities that correlates with the lives of their queer students. Once awareness of student identity is reached, teachers can begin to acquire additional information about the contexts of their LGBTQ+ students’ external environments beyond the classroom. Culturally and contextually relevant pedagogy that targets marginalized students raises awareness for all students in the classroom, thus optimizing engagement and mathematical discourse. Secondary mathematics teachers can eliminate the facilitation of sex-based participation that privileges heterosexual males by intertwining mathematics content with social concepts that consolidate queer identities with mathematical identities (Butler, 1990). If queer students can merge their own authentic identities with positive identities regarding mathematical ability, teachers can eliminate masculinized competition in the secondary mathematics classroom setting (Tiedemann, 2000).

*Analyzing the Secondary Mathematics Curriculum: Merging Content with Queer Identities*

 Secondary mathematics curriculum and content standards established by Common Core and state standards represent and reflect the neoliberal school of thought and emphasizes masculinized competition (Mendick, 2006). In the quest for technological supremacy and economic globalization, secondary mathematics standards in the US are designed to cultivate a STEM workforce that embodies the standards of “smartness” established by white, Western mathematics (Cech & Waidzunas, 2011). This perpetuates the dominance of white heterosexual male students in secondary mathematics and the dominance of white heterosexual males in the STEM workforce (Faulkner, 2009). The rigid, concrete quality of the Common Core and state mathematics standards emphasizes procedural memorization with minimal regard for conceptual understanding and contextual application. Because standardized assessments are often organized as a multiple-choice layout, the secondary mathematics curriculum values the correct answer as the ultimate representation of success in mathematics, which discounts other various forms of mathematical thought that could be presented in mathematics classrooms. Relating to the analysis of the perspectives of queer learners in secondary mathematics, the traditional approach of direct instruction that solely focuses on obtaining the correct answer to mathematics problems marginalizes the participation and engagement of queer youth and females in mathematical discourse (Tartre & Fennema, 1995). The current secondary mathematics curriculum standards are structured to promote direct, procedural instruction, which creates a meritocracy of masculinized competition within these classrooms (Boaler, 2002a).

 Specifically examining the mathematics curriculum and content via the usage of gender-specific terminology and pronouns, the language of secondary mathematics textbooks generally portrays a heteronormative image that only acknowledges heterosexuality and the gender binary as the default definition of gender based on biologically imperative gender assignment. The mathematics textbooks lack gender and sexual diversity and fail to recognize the identities of queer and non-gender conforming youth in secondary mathematics classrooms, affirming the hierarchical structure of mathematics that preserves the dominance of white heterosexual males.

 While the current structure of the secondary mathematics curriculum and the gender-specific terminology used in mathematics textbooks can only be addressed and changed at the macroscopic level of federal and state government entities, mathematics teachers can enact changes in their own classrooms to facilitate a more gender-inclusive curriculum. For instance, teachers can alter questions and problem statements in mathematics textbooks, or create new questions, to reflect more gender-inclusive language that acknowledges sexual diversity and variations in gender identity in relation to biological sex. Connecting to the perspectives of individual queer learners, mathematics teachers can create student-led activities that are contextually relevant to the external environments of LGBTQ+ students. Students can conduct mathematical investigation activities that explore the usage of pronouns (he/him/his, she/her/hers, they/them/theirs) to clarify the difference between gender identity and biological sex and to understand the meaning of the terms cisgender and transgender. Additionally, teachers can create hypothetical mathematical scenarios in discussion-based activities that acknowledge same-sex relationships and transgender individuals, thus deviating from heteronormative standards substantiated by the aura of intellectual superiority cultivated by Western mathematics. Utilizing the mathematics curriculum as a discovery tool to associate queer identities with positive mathematical identities raises social awareness and cultivates a sense of self-awareness of marginalization of queer youth, which leads to empowerment to enact social change.

**Implications**

 Based on the dynamics of intersectionality theory and the interconnectivity of the systems of marginalization, problematizing current classroom methodology and developing new pedagogical designs that accommodate LGBTQ+ youth in secondary mathematics can provide further insight for the improvement of pedagogical methods that address the marginalization of racially minoritized youth in mathematics. Because very little research on the marginalization of LGBTQ+ youth in mathematics education has been conducted, this research can shed light on the power dynamics of systemic discrimination that render minoritized youth “invisible”. The labeling of queer youth is based on perceptions of behavior that correlate with the definitions of masculinity and femininity established by the social construct of the gender binary (Esmonde, 2011). The minoritized category of LGBTQ+ and non-heteronormative youth does not display a specific physical phenotype that can be visibly recognized like race and gender. As a result, research that focuses on marginalization of queer youth in mathematics analyzes heterosexual systems of oppression on an individual basis and deepens understanding of intra-group relations heterogeneously, which provides insight into research methods that can be utilized to examine individual differences among categorized groups of marginalization based on race and gender (King & Cortina, 2010). These groups are often studied and analyzed homogenously as cohesive communities, which can lead to false assumptions that generalize or stereotype the behaviors and characteristics of individual members of marginalized groups with visible phenotypes. Broad generalizations and assumptions can further perpetuate systemic discrimination that already exists. What research methods can be used to examine the marginalization of racially minoritized youth and females on an individual basis that reveals unique counter-narratives?

 Additionally, LGBTQ+ youth represent a very small percentage of students in the public education system, which leads to questioning of the value of tailoring the mathematics curriculum to meet the specific requirements to promote equitable outcomes for queer students in mathematics. If teachers invest considerable time in curriculum planning to foster gender inclusivity, does this leave behind accommodations of contextual relevance for racially minoritized youth? The limitations of the arguments in this Capstone are that the intersectional perspective of race with gender and sexuality is not fully accounted for. While the conceptual framework recognizes the interconnectivity of race, gender, and sexuality based on intersectionality theory, the problematization of the stratification of queer youth in mathematics does not specifically address the influence of race and socioeconomic status.

**Further Considerations**

 To promote gender inclusivity and equitable outcomes for queer youth in secondary mathematics classroom settings, teachers should be required to experience cultural competency training that raises social awareness of the power dynamics of compulsory heteronormativity in mathematics education and the US public education system. Most mathematics educators that identify as heterosexual are not aware of the sexual identities of their students and may make false assumptions about sexuality and gender identity based on perceived behavior and biological definitions of gender (Esmonde, 2011). To address these assumptions, cultural competency training should introduce the definition of gender, as well as race, as a social construct to facilitate awareness of the secondary mathematics classroom as a racialized and gendered space that contributes to systemic inequities for minoritized youth (Leyva, 2017). To address the competitive nature of mathematics curriculum standards that diminish opportunities for participation and engagement of queer youth, mathematics teachers should be introduced to the conceptual objectives of project-based learning and discussion-based activities that foster personal agency and mathematical discourse. Additionally, professional development sessions for teachers should address the usage of correct pronouns that align with gender identity, which can clarify the distinction between the definitions of gender identity and biological sex. Misconceptions of gender definitions lead to sex-based treatment and equate mathematics with masculinity and neoliberal definitions of intelligence rooted in standards of whiteness. However, some limitations of the implementation of these types of professional development sessions include the religious beliefs of some mathematics teachers that adhere to the practices of compulsory heteronormativity as factual and moral. Additionally, the geographic location of schools can affect the ability to implement these cultural competency trainings due to lack of access to resources that facilitate awareness of the realities of the issues affecting the LGBTQ+ community.

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