# ADDRESSING SEXISM AND ASSOCIATED GENDER INJUSTICES THROUGH SOCIAL JUSTICE MATHEMATICS CURRICULA

GERRENNE GUNTHROPE

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## ABSTRACT

Patriarchal and sexist discourses have limiting and negative influences on ideologies about sex and gender, personal and social identities, social practices, power relations, interpersonal relationships, and other aspects of being human, in Western democracies like Canada and the United States of America. Using different types of mathematics as interpretive tools has the potential to deepen adolescents' understanding of social injustices that are informed by patriarchal and sexist discourses. Two social justice mathematics (SJM) curricula for middle school students, and one SJM curriculum for Grade 9 students, were analyzed in this study using Michelle Lazar's (2005) principles for conducting feminist critical discourse analysis, as well as an analytical method that was adapted from James Gee's (2011) method for carrying out discourse analysis. The findings of this project give insight into what should be considered by SJM educators who would like to design SJM curricula that can specifically support students' development of a revolutionary feminist consciousness regarding sexism and associated gender injustices. Based on the findings common to all three SJM curricula, several implications related to SJM curriculum development, as well as research about it, emerged.

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# CHAPTER 1

# INTRODUCTION

Through the analysis of three social justice mathematics (SJM) curricula that were developed by three teachers who have taught mathematics in middle or high school instructional contexts, I sought to answer the following central research question: *When relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society*? Due to the nature of this research question, I chose to use Michelle Lazar's (2005) principles for conducting a feminist critical discourse analysis study to guide my analytical approach to the data set that included curricular and interview-based data. The central research question also informed my construction of a specific analytical method for analyzing the curricular data of the study. I based my analytical method on James Gee's (2011) method for discourse analysis. To enrich the analyses of the curricular data collected in this study, I conducted semi-structured interviews with each participant before and after my analysis of their SJM curriculum. The findings of this research project produced several implications for SJM curriculum development and conducting research about it, one of which includes the importance of considering how societal discourses can impact middle school and high school students' ongoing critical consciousness development regarding the realities of sexism and associated gender injustices in Canada and the United States.

## My Critical Consciousness Development About Sexism and Related Injustices

I am an Afro-Canadian, heterosexual female, who is the daughter of Antiguan parents. I was born in Toronto, Ontario, and I grew up in a suburb of Toronto in a Christian, liberal,

working-class home led by a single mother, who continues to be a great example of what a compassionate and intelligent human being is. By the time I entered my teenage years, I noticed and questioned what I now know to be *oppressive sociopolitical realities*, such as socioeconomic inequalities and racism, which were present in my own life and the lives of other people living in Canada and elsewhere. I often thought that such realities did not need to exist, and I wanted to know why they did. In thinking back to my teenage years, I remember that I was particularly bothered by what I eventually realized was sexism, primarily because it seemed to be accepted as normal by some adolescents and adults across different ancestral/ethnic backgrounds. The most vivid memories from my teenage years regarding sexism were the disappointing and limiting ways in which girls and women of different demographic backgrounds were viewed or treated by boys, girls, men, and women in relation to different aspects of human life, some examples of which included, but were not limited to: the restrictive expectations about teenage and adult women's outward appearance and dress; the objectifying ways in which female sexuality and the female body were described and represented in films, music, literature, as well as religious texts and practices; and people's denigration of female competence, wisdom, and leadership in different private and public contexts—from family and religious contexts to electoral politics.

While I was always questioning attitudes, ideas, expectations, and norms that seemed to limit and devalue girls and women of different ethno-cultural backgrounds and sexual orientations in one way or another, or that supported the idea that girls and women should accept some form of control by others, I did not have the language to help me understand sexism more fully until I had minored in sociology during my undergraduate years. Through the preparation and implementation of my doctoral research study, my understanding of sexism significantly deepened based on the knowledge I gained from a specific feminist perspective (i.e., hooks,

1984, 2000), a specific historical analysis of patriarchy (i.e., Lerner, 1986), a sociological analysis of patriarchy that is partly informed by important insights from multiple radical feminist analyses and theories (i.e., Johnson, 2014), and findings from research studies that have analyzed oppressive gender realities in North American and other societies, which I will cite throughout this writing. All these critical perspectives have helped me to further appreciate the importance of understanding the connections between sexism and oppressive gender realities, some of which I have observed and learned about through my own, and other people's, lived experiences.

**Patriarchy and Sexism**

One of the ways in which we can develop a more meaningful consciousness about the everyday instances of sexism in North American and other societies is to better understand the structural system of oppression that radical (or revolutionary) feminists refer to as *patriarchy*. Although there is no one definition and theorization of patriarchy in the literature, it is often positioned as functioning at the macro-level or institutional level of a sexist/patriarchal society. There is also no one definition and theorization of sexism, but it is often positioned as functioning at the micro-level or (inter)personal level of human life. Nonetheless, I contend that from their unique perspectives, Gerda Lerner (1986), Allan Johnson (2014), and bell hooks (2000) have articulated definitions, interpretations, and theorizations of patriarchy and sexism that demonstrate the importance of recognizing both forms of oppression in order to better understand oppressive gender realities we witness and/or experience in our lives and societies.

The late historian and feminist Gerda Lerner (1986) completed an eight-year study in which she found that the system of patriarchy resulted from multiple and complex historical developments between approximately 3100 BCE to 600 BCE in Mesopotamian/Ancient Near Eastern societies. One key historical development was the emergence of various processes

through which women's sexuality—that is, women's capacity to be sexual partners and their sexual reproductive capabilities to become mothers—became economically commodified. These processes included, but were not limited to, women: being sold or exchanged in marital arrangements, which financially benefitted their birth families; and being used in, or sold into, sexual slavery by conquering tribes. Another important historical event that occurred during the establishment of archaic states ruled by kings was the institutionalization of family units in which: men (e.g., fathers and/or husbands) were socially recognized and expected to be familial leaders who should hold asymmetrical levels of power; and women (e.g., wives, concubines), as well as children, were socially recognized and expected to be dependent subordinates to their familial male heads. This familial structure within archaic states was compensation for "the dependence of male family heads on the king or the state bureaucracy" (Lerner, 1986, p. 216).

Supported by her research analyses, Lerner (1986) defined patriarchy as "the manifestation and institutionalization of male dominance over women and children in the family and the extension of male dominance over women in society in general" (p. 239), and sexism as "the ideology of male supremacy, of male superiority and of beliefs that support and sustain it" (p. 240). Lerner's (1986) discussion of the events that contributed to the establishment of patriarchy in Mesopotamian societies over a 2500-year period demonstrates that, although most women in an ancient or a modern patriarchal society do not tend to gain more privileges and advantages from participating in, or supporting, their own subordination to men who are at the same social location, women's intentional or unintentional participation in personal and/or societal subordination to men can be ascribed to various factors, including, but not limited to:

> [patriarchal] gender indoctrination; educational deprivation; the denial to women of knowledge of their history; the dividing of women, one from the other, by defining

> "respectability" and "deviance" according to women's sexual activities; by restraints and outright coercion; by discrimination in access to economic resources and political power; and by awarding class privileges to conforming women. (p. 217)

For Lerner, patriarchy and sexism tend to reinforce each other in such a way that when one is (re)produced by people in a society, the other is (re)produced as well. While men are limited and harmed by patriarchy and sexism in various ways, women at the same or different social location as men tend to be more disadvantaged and harmed by the ways in which patriarchy and sexism are intentionally, or unintentionally, (re)produced within their societies. This reality has been observed across different time periods, such as in late medieval England (see Bennett, 1997).

In the last edition of his book, *The Gender Knot: Unraveling our Patriarchal Legacy*, the late American sociologist, Allan Johnson (2014), describes some of the manifestations of patriarchy in modern American society, as well as what he thinks is needed to help dismantle the influence of patriarchy. Johnson (2014) defines patriarchy as a cultural/societal system that enables male privilege to be (re)produced in four ways: (I) through expectations and support for male dominance in "positions of authority" (p. 6) across various areas of human life, including, but not limited to, family and domestic life, politics, religion, and the law; (II) by identifying societies in terms of what is culturally associated with being male (e.g., manhood and masculinity) with "what is considered good, desirable, preferable, or normal" (p. 7) for human beings to possess within societies; (III) by centering males in different contexts so that "the focus of attention is primarily on men and boys and what they do" (p. 10); and (IV) by creating societies in which males develop "an obsession with control as a core value around which social and personal life are organized" (p. 13). Stated more succinctly, patriarchy is "a *social system* organized around the principles of *male dominance*, *male centeredness*, *male identification*, and

an obsession with control that is gendered as masculine" (Johnson, 2014, p. 293, emphasis in original). Within a footnote, Johnson (2014) states that sexism refers to "anything that has the effect of promoting male privilege, regardless of the intentions of the people involved" (p. 16).

While not, in any way, overlooking the negative consequences women experience by living in patriarchal societies—from being expected to be subordinate to men in a wide range of human interactions, relationships and power relations, to experiencing male violence—Johnson (2014) highlights the various ways in which men are limited by their internalization and externalization of patriarchal values. Johnson makes insightful comments throughout his book about the way in which control and fear interact with one another to help males/men at any social location stay committed to patriarchal values associated with maleness/manhood, despite the ways in which their emotional health, interpersonal relationships of all kinds, and other aspects of their humanity are consequently limited and undermined. The following points raised by Johnson (2014) regarding the inter-relatedness of control and fear in men's lives are insightful:

> Because patriarchy is organized around male-identified control, men's path of least resistance is to protect themselves by increasing their own sense of control, and patriarchy provides many ways of doing that….Men's participation in patriarchy tends to lock them in an endless pursuit of and defense against control, *for under patriarchy, control is both the source of fear and the only solution offered for it*…As each man pursues control as a way to defend and advance himself, he fuels the very same response in *other* men. This dynamic has provided patriarchy with its driving force for thousands of years. Men pay an enormous price for participating in this. The more in control men try to be, the less secure they feel. They may not know it because they're so busy trying

to be in control, but the more they organize their lives around that effort, the more tied they are to the fear of *not* being in control. (p. 51, emphasis in original)

In her book *Feminism is for Everybody: Passionate Politics,* American feminist theorist and educator, bell hooks (2000), describes patriarchy as "institutionalized sexism" (p. ix) and defines it as "a system of [male] domination" (p. 7) based on "the assumption that [males] are superior to females and should rule over [them]" (p. ix). Although hooks (2000) does not articulate a specific definition of sexism, she does discuss throughout her book the varied ways in which patriarchy negatively influences humans' lived experiences in modern life—from the consequences of people internalizing and/or constructing gender-related identities that reinforce patriarchal values, to violence committed by human beings, regardless of their sex. Based on hooks' (2000) examples of patriarchy and sexism, one could think of sexism as everyday, non-institutional instances of, or support for, male dominance by any person.

**Revolutionary Feminist Consciousness**

Viewing patriarchy and sexism as contributing to the (re)production of oppressive gender realities, hooks (2000) defines revolutionary (or "visionary") feminism as "a movement to end sexism, sexist exploitation, and oppression....which implies that all sexist thinking and action is the problem, whether those who perpetuate it are female or male, child or adult" (p. 1). Hooks (2000) does not explicitly use the term *revolutionary feminist consciousness* to define the type of consciousness we need to develop to recognize and address the consequences of sexism and patriarchy in our lives and society. However, hooks (2000) does describe key elements of her theorization of revolutionary feminism and how it can benefit different areas of our personal and social lives within private and public contexts. Based on my understanding of hooks' (2000) writing, our development of a revolutionary feminist consciousness involves, at a minimum:

- becoming more conscious of, as well as developing a critical understanding of, how sexist/patriarchal thinking and behaviour are reflected in culture, religion, economic structures, political structures, and other important aspects of human life;
- recognizing how we might have internalized different aspects of sexism and patriarchy through the interpretation of our own sex, the conscious and unconscious construction of our own identities, and our interpretation of other people's sex and identities;
- recognizing how we are (re)producing sexism and patriarchy in our lives and society;
- seeking to change our own thinking and behaviour in relation to ourselves and others by resisting the influence and impact of sexism/patriarchy in our own lives; and
- whenever possible, working with others to end the influence and impact of sexism/patriarchy in our society and the world-at-large, which, I would add, should be sought in non-coercive ways that support truth and contribute to justice for all people.

**Revolutionary Feminist Consciousness as Critical Consciousness**

The development of a revolutionary feminist consciousness throughout my life could be considered as one example of *critical consciousness development* with respect to sexism and associated oppressive gender realities. The meaning of critical consciousness I am referring to here is Paulo Freire's (1970/2009) conceptualization of a critical consciousness—or "*conscientização*" (p. 35, italics in original)—regarding oppressive sociopolitical realities, which was a central component of the educational theory and practice he discussed in *Pedagogy of the Oppressed*. I would paraphrase Freire's (1970/2009) description of a person's critical consciousness as their increasing awareness and questioning of oppressive sociopolitical realities that limit their own and other people's lives and choices in personal, social, cultural, political, economic, and other contexts, as well as their subsequent desire to change such realities.

## Supporting Critical Consciousness About Social Injustices in Math Education

For over 30 years, the goal of supporting the development of elementary, secondary, and post-secondary students' critical consciousness about oppressive sociopolitical realities using mathematics as one of multiple interpretive tools has been pursued through a small, but growing, subfield of mathematics education referred to as "criticalmathematics education" or "critical mathematics education" (Frankenstein, 2012; Powell, 2012; Skovsmose, 2012). In describing one perspective of the historical foundations and development of criticalmathematics education, Arthur Powell (2012) notes that various mathematicians, and mathematics education scholars and practitioners, from around the world have contributed to, or influenced, the formal development of this field since the late 20th century, which was partly due to their ideas and concerns about: the aforementioned goal related to critical consciousness development; teaching and learning about the cultural aspects of mathematics (e.g., ethnomathematics); educational inequities in some students' mathematical learning experiences in school; and other critical and social justice oriented educational goals related to the teaching, learning, and/or utilization of mathematics. Such issues were discussed at national and international conferences and meetings.

Powell (2012) notes that Marilyn Frankenstein's (1983) application of Paulo Freire's educational philosophy to mathematics education pedagogy—which she used in her college mathematics teaching practice (e.g., Frankenstein, 1990)—made a significant contribution to this new approach to mathematics education in the United States. Frankenstein (2012) herself points out that her pedagogical, theoretical, and curricular work resulted in her being the first person to use the term "critical mathematics education" in English-language publications during the 1980s. Frankenstein (2012) also notes that Arthur Powell, John Volmink, and she—who all co-founded the Criticalmathematics Educators Group in 1991—thought that a critical approach to math

education could be called "criticalmathematics education," with the term "criticalmathematics" reflecting their hope that "one day all mathematics education would be critical" (p. 49).

The formalization of critical mathematics education was also being accomplished in Europe, with Ole Skovsmose making a significant contribution to the field there through his graduate work. Frankenstein (2012) points out that around the time she (and others) had been exploring the practical and theoretical goals of criticalmathematics education, Skovsmose, in Denmark, had also referred to his work as "critical mathematics education." Skovsmose (2012) believes that critical approaches to teaching and learning mathematics—from "the range of educational ideas and initiatives that have developed around the notion of social justice" to "investigations of mathematical modeling [that] have revealed [how] modeling [can be] a questionable process" (p. 44)—may also be viewed as critical mathematics education.

I have found Authur Powell and Marilyn Frankenstein's description of critical mathematics education to be helpful to my own understanding of the field's goals and concerns related to curriculum, teaching and learning. Based on how he and Frankenstein had described criticalmathematics education in an article they co-wrote, Powell (2012) states that:

> [C]riticalmathematics defines a pedagogical perspective that connects education in mathematics with critical analyses of social, economic, cultural, and political issues and with movements for social change. Criticalmathematics educators teach for understanding rather than memorization, start with the mathematical knowledge of students, and engage students to reflect critically on both the substance and process of their learning...Moreover, criticalmathematics attends to the dynamics of power in society to understand the effects of racism, sexism, ageism, heterosexism, monopoly capitalism…and other alienating, totalitarian institutional structures and attitudes. (p. 31)

With respect to supporting learners' mathematical development, Powell (2012) notes that criticalmathematics education should provide students with opportunities to do "cognitively demanding mathematics in ways that help them succeed in learning" (p. 27). As a former high school math and science teacher, who first learned about critical mathematics education during my doctoral work, which I had pursued after my high school teaching years, I deeply appreciate, and agree with, Powell's emphasis on the importance of supporting students' mathematical development whenever educators teach learners using critical mathematics education principles.

Critical mathematics education scholars and educators who made a significant contribution to the literature of this field have included pedagogical and curricular goals that relate to learning mathematics through exploration of *social inequalities* (e.g., racial inequality, income inequality, etc.) and *forms of social oppressions* (e.g., racism, classism, etc.)—the combination of which I consider to be *social injustices*—for the purpose of helping students understand and utilize mathematical concepts in order to better recognize, understand, and change these types of injustices (e.g., Frankenstein, 1983, 1990; Gutstein, 2006; Powell, 2012; Skovsmose, 2012). Consequently, during my dissertation study, I described curricula, pedagogy, and other aspects of critical mathematics education, as well as the scholars and educators who engage in critical mathematics education, using the term *social justice mathematics (SJM)* adjectivally (e.g., SJM curricula; social justice mathematics education; SJM educators).[1] Another reason why I chose to use social justice mathematics and SJM adjectivally is that I wanted to continuously point to critical mathematics education as a field of study and practice that can inform scholars' and practitioners' critical and social justice work in math education.

[1] I first used the term "social justice mathematics," and its acronym "SJM," in my dissertation proposal, which was completed several years before I read math educator Kari Kokka's (2019) research article in which she uses the terms "Social Justice Mathematics" and "SJM" as nouns.

For mathematics educators for whom critical mathematics education may be new, there are important examples of SJM curricula in the published literature discussed by scholars and practitioners working within elementary, secondary, and post-secondary contexts that reflect a commitment to the two goals of: supporting students' critical consciousness development; and strengthening students' understanding of mathematics from utilitarian and critical perspectives. Such examples include, but are not limited to: textbooks (e.g., Frankenstein, 1989); books in which scholars and teachers discuss different aspects of critical mathematics education and/or share examples of their SJM curricula and teaching experiences (e.g., Gutstein & Peterson, 2013; Wager & Stinson, 2012); and peer-reviewed research articles about the results of pre-service and in-service teachers' development and/or teaching of SJM curricula (e.g., Aguirre et al., 2019; Gonzalez, 2009; Kokka, 2019). In some of these and other texts, researchers and educators also share insights about students' positive responses to SJM curricula and pedagogy with respect to their critical consciousness and mathematical development. While more structured research-based analyses about the benefits to students' critical consciousness development and mathematical development are needed as critical mathematics education grows, Eric Gutstein's (2006) practice-based and research-based insights provide strong evidence that students' engagement with SJM curricula can benefit them in both areas of development.

During his teaching experience at an urban middle school in Chicago, Gutstein (2006) not only engaged his Grade 7 and 8 mathematics students in critical and social justice–oriented curricula, he also developed a specific type of pedagogy that he calls "teaching mathematics for social justice," which consists of three "social justice pedagogical goals" and three "mathematical pedagogical goals" (p. 23). One of the social justice pedagogical goals that Gutstein (2006) describes pertains to helping learners develop a "*sense of social agency*" (p. 27,

emphasis in original) in response to their engagement with his curricula. For Gutstein (2006), helping students to develop a sense of social agency means providing them with opportunities through which they can develop "a belief that they are capable of contributing to historical processes" (p. 27) in their communities and society, as well as in other societies around the world, in order that they might affect social change. One of the mathematical pedagogical goals central to Gutstein's (2006) pedagogy is about helping students to develop "mathematical power" (p. 29) so that they can use mathematics to understand oppressive sociopolitical realities that impact them and others and utilize math as a tool to change those realities in positive ways. Both these and the other four goals of teaching mathematics for social justice are intended to facilitate positive outcomes for students' mathematical development, as well as increase their confidence in being agents of change due, in part, to their critical consciousness development.

While committed to helping his students develop mathematical power through their learning of the standard reform-based curriculum, Gutstein (2006) also facilitated "real-world projects and related conversations" (p. 41) which addressed various forms of social oppression and inequalities that exist locally and globally. Gutstein's real-world SJM projects ranged from the study of the process of gentrification of a neighbourhood in which some of his students resided, to understanding the scale and impact of wealth inequality across nations. In addition to his observations about how students responded to his SJM curricula and pedagogy during classroom and community activities, Gutstein (2006) used other measures to assess how students' engagement with his real-world projects impacted them. These measures included, but were not limited to: student responses to open-ended surveys; focus-group and individual interviews; and results from students' mathematical school work. Overall, Gutstein (2006) found

that “when positive conditions were present, [his] students’ learning was significant and...they developed sociopolitical consciousness and a sense of social agency.” (p. 164).

In his analysis of the work of his two-year Grade 7 and 8 honors-track math students, including their real-world projects, Gutstein (2006) found that, to varying degrees, these students demonstrated that they were able to learn how to “invent and communicate their own solution strategies, represent mathematical ideas in multiple ways, and justify their arguments” (p. 110). Gutstein (2006) also reports that 26 of the 28 students of this class passed their grade 8 standardized test (known as the Iowa Test of Basic Skills), and of those that took tests to enter college preparation high schools, most students were accepted. Gutstein (2006) also collected survey data which suggested that the honors-track students’ views about math, including its usefulness in understanding social justice issues, seemed to have, in some ways, changed as a result of their engagement with the real-world projects they had done in his class. In a survey Gutstein had given to his honors-track students at the end of grade 8, most indicated that their experiences of doing the SJM projects expanded their view of math to include its importance in helping them understand social realities involving injustices of some kind.

As is evident in the outcomes of Gutstein’s (2006) teaching practice and research, critical mathematics education scholars and educators whose work has directly or indirectly impacted the learning experiences of children, teenagers, and adults, often support the kind of SJM curricula that can strengthen students’ critical consciousness development of ongoing social asymmetries, disadvantages, discriminations, inequalities and other social injustices that affect them and/or others by using mathematics as (at least) one set of interpretive tools to identify and understand these types of problems. SJM scholars and educators also want mathematics learners to deepen their understanding of mathematical concepts and ways of thinking as they critically

question, and reflect on, social injustices in the world. In seeking to meet both these goals, along with other curricular and pedagogical goals, critical mathematics education scholars and educators have helped to expand what learning mathematics can mean from an academic standpoint, as well as a human development standpoint, across all levels of formal schooling.

## Supporting Critical Consciousness About Gender Injustices in Math Education

### The Problem: A Curricular Gap

Some mathematics educators have sought to give students the opportunity to critically think about different kinds of gender injustices that are rooted in sexism through their curricula, whether they have been educators who are committed to the goals of critical mathematics education as a field of study and practice (e.g., Frankenstein, 1989), or educators who have recognized how students could benefit from learning mathematics in sociopolitical contexts that involve meaningful and important life issues (e.g., Kitchen & Lear, 2000). However, my survey of published SJM curricula indicate that social injustices which are consequences of sexism are underrepresented when compared to social injustices that are rooted in other forms of oppression such as racism and socioeconomic classism. Moreover, some SJM curricula that directly or indirectly address gender injustices rooted in sexism do not necessarily create spaces for students to critically, and explicitly, question the connections between oppressive gender realities *and* the various ways by which sexism is (re)produced in their lives and society.

The underrepresentation of sexism and associated injustices creates a curricular gap in SJM education which should be filled for a variety of reasons, not the least of which is that research has shown how sexism can contribute to limiting, unhealthy and dehumanizing experiences for people in patriarchal/sexist societies. For instance, empirical and analytical research results directly or indirectly indicate that sexism in North American and other societies

can: negatively impact the well-being of boys and men (e.g., Chu et al., 2005; Wong et al., 2017) and girls and women (e.g., Cesario & Moran, 2017; Fischer & Bolton Holz, 2010); contribute to sexual harassment of women in the workplace (e.g., Collier & Raney, 2018); contribute to the perpetration of, or attitudes of acceptance about, male perpetrated intimate partner violence and sexual violence against women (e.g., Chinkin, 2014; Dragiewicz & DeKeseredy, 2012; Herrero et al., 2017; Ricci & Bergeron, 2019; Zinzow & Thompson, 2015); and contribute to the perpetration of, or views supporting, male perpetrated violence against women in prostitution (e.g., Farley et. al., 2004; Farley et al., 2015; Jovanovski & Tyler, 2018). These and other research-based insights support hooks' (2000) argument that we all need to recognize how sexism can negatively impact our dignity, potential, freedom, and ability to love, as well as our views, expectations and treatment of ourselves and others, regardless of our sex and identity.

**Part of the Solution: Developing Revolutionary Feminist Consciousness**

Constructing more SJM curricula that explicitly address sexism and associated gender injustices is one step towards closing the curricular gap in SJM education. However, ensuring that students who engage with such curricula develop a meaningful critical consciousness about these social problems is equally important because sexism and related injustices are not necessarily seen as problematic by adolescents and adults due, in part, to the hegemonic influence of sexism/patriarchy on gender ideologies, social practices, power relations, and other aspects of our human experiences and identities (hooks, 2000; Lazar, 2005, 2007). With these considerations in mind, I contend that the kind of critical consciousness people need to recognize and address the internal *and* external factors which contribute to the (re)production of patriarchy, sexism, and associated gender injustices, is a revolutionary feminist consciousness.

## Another Part of the Solution: Considering the Role of Discourse

One of the ways through which people can develop a meaningful critical consciousness about oppressive sociopolitical realities in general, and a revolutionary feminist consciousness about oppressive sex-based and gender realities in particular, is by seeking to understand those realities using the lens of *discourse* from conceptualizations that view it as being "much more than language" (Weedon, 1999, p. 125). Such conceptualizations of discourse take into consideration the social factors that contribute to human ways of thinking, communicating, acting, and being in the world—from socially shared stereotypes about people based on immutable characteristics (e.g., sex and ancestry/'race') and different aspects of their social location (e.g., socioeconomic class and educational background), to power relations between different people belonging to various categories of social difference. Some poststructuralist notions of discourse reflect this broad view of it (Lazar, 2005; Weedon, 1999).

### *The Conceptualization of Discourse Used in This Study*

For this study, James Gee's (2011) conceptualization of discourse was used. Gee's definition of discourse is partly rooted in what can be described as a specific poststructuralist conceptualization of discourse, and is based on 11 other concepts theorized by different scholars in works published from the middle of the 20$^{th}$ century to the early 2000s. Citing the relevant scholar(s) associated with each of the 11 concepts, Gee (2011) identifies those concepts as: "communities of practice;" "cultural communities;" "discourse communities;" "distributed knowledge or distributed systems;" "thought collectives;" "practices;" "cultures;" "activity systems;" "actor-actant networks;" "collectives;" and "'forms of life'" (p. 40). Gee (2011) refers to his notion of discourse using the term "Discourse" (with an uppercase "D"), describing it as "ways of combining and integrating language, actions, interactions, ways of thinking, believing,

[and] valuing, [as well as] using various symbols, tools, and objects to enact a particular sort of socially recognizable identity" (p. 29). Gee (2011) distinguishes "discourse" (with a lowercase "d") from "Discourse" by noting that he uses the former word to mean "language-in-use or stretches of language" (p. 34) in people's spoken or written communications. Despite this distinction, I will use a lowercase "d" for discourse when referring to Gee's conception of "Discourse" in this writing, as my analysis of the data set did not require making this distinction.

Conceptualizations of discourse like Gee's (2011) can be important for SJM educators to consider when they develop SJM curricula about gender and other social injustices because such discursive frameworks can give them insight into how students' critical consciousness (including a revolutionary feminist consciousness) might be undermined by dominant discourses that (re)produce these oppressive sociopolitical realities in societies such as sexist discourses, racist discourses, and classist discourses.[2] Being concerned about the impact of oppressive and dominant discourses on students' critical consciousness development is not insignificant because, as Gee points out, discourses have important characteristics which contribute to their potential influence on what we say, do and think, as well as who we are or want to be. Several noteworthy characteristics of discourses that Gee (2011) discusses include, but are not limited to, the following: (i) discourses are embedded in our social institutions and social practices and therefore exist in the world before we come into it and enact them through our words and actions; (ii) trying to be recognized as belonging to a particular discourse may or may not be conscious on our parts; (iii) discourses are not fixed entities in isolation, but are defined in relationship to other discourses by way of complicity or contestation; (iv) while discourses exist

[2] In the rest of this writing, I will refer to 'discourses' to acknowledge that any one discourse can manifest itself differently within different cultural, sociopolitical, and other contexts over time.

regardless of our participation in them, they also exist as a consequence of the work we do to be recognized in particular ways; and (v) whether or not we are conscious of our enactment of discourses, they act like "[mental maps] in our heads by which we understand society" (p. 39).

## The Central Research Question and Goals of This Study

Inspired, in part, by a concern about the curricular gap in SJM education regarding an apparent lack of consciousness-raising learning opportunities through which math learners can critically think about sexism and associated gender injustices in ways that might initiate or expand their revolutionary feminist consciousness about these social problems, this doctoral study examined three SJM curricula that address gender injustice in some way. Each SJM curriculum was constructed by an educator who has taught mathematics at the middle school or high school level, and whose work has been informed by (at least) some of the goals of critical mathematics education. Guided by the principles of feminist critical discourse analysis (Lazar, 2005), a SJM lesson, a SJM project, and a SJM unit that had been developed by the participants of the study were examined in order to answer the following central research question: *When relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society*? To analyze each written SJM curricula in practical terms, I developed and used an analytical method that was based on Gee's (2011) theory and method for conducting discourse analysis.

By seeking specific answers to the central research question of this study, I sought to meet three research goals that could be insightful to SJM curriculum development overall within critical mathematics education. Firstly, as implied by the central research question itself, I wanted to better understand how the consciousness-raising potential of SJM curricula might be

impacted by relevant oppressive and anti-oppressive discourses. Secondly, I wanted to explore the extent to which providing mathematics learners with opportunities to consider the connections between sexism (in addition to other relevant forms of oppression) and gender injustices could help them develop a critical consciousness about these social problems. Within the conceptual framework of this research project, this second goal means that students' development of a critical consciousness about how sexism and associated gender injustices are related is an important part of their revolutionary feminist consciousness development. Thirdly, this study sought to consider the extent to which mathematical knowledge, in conjunction with other forms of knowledge, could potentially support students' critical reflection about their own, and other people's, internalized sexism when they engage with the participants' SJM curricula.

## Dissertation Overview

In this chapter, I have sought to contextualize the central research question and major goals of this research study. I have also described one of the central concepts that is part of the conceptual framework of the study: namely, Gee's (2011) conceptualization of discourse. In Chapter 2, I elaborate on specific types of discourses and knowledge that are relevant to this project, and I discuss other central concepts that comprise its conceptual framework.

In the chapter about the research study's methodology (that is, Chapter 3), I describe the strategies I used to recruit voluntary participants for the research project, giving a brief profile of each of the three educators who became participants. In Chapter 3, I also describe the data collection methods used in the study, the data set of the study, and the analytical framework of the study. I end Chapter 3 with a discussion about how I ensured the validity of the findings.

The findings and related discussion associated with my analysis of each participant's SJM curriculum are shared in Chapters 4, 5, 6, 7, 8 and 9, with two consecutive chapters

dedicated to each participant's SJM curriculum. The central research question is addressed for each participant's SJM curriculum in the second findings and discussion chapter related to each SJM curriculum. In the final chapter of this writing, Chapter 10, I articulate a wholistic answer to the central research question of the study that focuses on the commonalities amongst all the findings. In this chapter, I also address the limitations of the research project, and I discuss the implications of the study in relation to SJM curriculum development and future research about it.

# CHAPTER 2

# LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

## Conceptual Framework

### Discourses That Informed the Feminist CDA Used in This Study

The pervasiveness and negative effects of sexism and associated gender injustices, including gender inequalities, are not positioned in our public discourse—nor, for some of us, through our personal views—as significant social problems as much as they should be. Part of the reason for this ongoing reality is the presence of a group of oppressive discourses that I refer to as *discourses of hierarchy, domination, and subordination*. I define discourses of hierarchy, domination, and subordination as oppressive discourses in societies that promote structural hierarchies between different social groups, domination by certain social groups, and subordination of particular social groups. Such discourses function to minimize oppressive sociopolitical realities, including social injustices, while legitimizing the underlying factors that serve to (re)produce and maintain them. People can be influenced by these discourses through their identification with, or membership in, different social groups distinguished by ancestry/'race,' sex and gender, sexual orientation, socioeconomic class, etc. Based on Gee's (2011) conceptualization of discourse, these oppressive discourses can unconsciously impact people's core and social identities, interpersonal relationships, power relations, and so forth.

Certain discourses of hierarchy, domination, and subordination have been hegemonic over long periods of human history, presenting themselves differently in different historical eras and within different cultural, sociopolitical, and other contexts. Such discourses include, but are not limited to, *patriarchal and sexist discourses, colonial discourses,* and *racist discourses*.

Other discourses of hierarchy, domination, and subordination have emerged relatively recently, such as *capitalist discourses* and *neoliberal discourses*. Whether they have been around for centuries, in one form or another, or for several decades to a century, discourses of hierarchy, domination, and subordination are often positioned in both overt and subtle ways as natural, normal and/or unproblematic, which leads to aspects of these oppressive discourses being accepted, tolerated and (re)produced by some, if not many, people—whether consciously or not—even when anti-oppressive discourses exist and are enacted by other people in ways that seek to counter such societal discourses, and which seek to ensure that dignity, equality, and justice can be a reality for all people. Furthermore, what tends to make some discourses of hierarchy, domination, and subordination exist across cultures, societies, and time periods—in one form or another—is the direct and indirect, as well as the intentional and unintentional, reinforcement of aspects of those discourses by other prevalent societal discourses which tend to be positioned as egalitarian and/or progressive. In our current age, such prevalent egalitarian and/or progressive discourses include, but are not limited to, various other *liberal discourses (including liberal feminist discourses), conservative discourses, and postfeminist discourses*.

Five discourses proved to be particularly relevant to my feminist CDA of the SJM curricula that were contributed to this study, although insights about other discourses were also helpful to my analysis of the SJM curricula (e.g., racist discourses). Of these five discourses: two are discourses of hierarchy, domination, and subordination (that is, sexist discourses and neoliberal discourses); two are societal discourses that have aspects which can serve to support sexist discourses (that is, liberal discourses and postfeminist discourses); and one discourse that is counter to sexist discourses (that is, revolutionary feminist discourses). Due to their relevance in this study, I will describe all five discourses from my own and other scholars' understanding.

***Patriarchal/Sexist Discourses***

Based on insights from hooks (1984; 2000), Johnson (2014) and Lerner (1986) regarding sexism and patriarchy, as well as insights about the nature of discourse from both Gee (2011) and Lazar (2005; 2007), I define *patriarchal and sexist discourses* as discourses that promote ideas/ideologies/ways of thinking, power relations, interpersonal relationships, social practices, individual or collective behaviours, as well as sex-based expectations and gender expectations, which facilitate: (1) male domination of people of any sex and identity, male centeredness within a society, the protection of male human rights and freedoms at the cost of female human rights and freedoms, and the resistance to holding males accountable when they harm any other human being; and (2) the subordination and oppression of females by any person including, but not limited to, the undermining or suppression of females' sex-based human rights, protections, and freedoms, as well as the creation or (re)production of oppressive sex and gender hierarchies that disadvantage females in a society. Due to the relationship between patriarchy and sexism, I will refer to sexist and patriarchal discourses interchangeably or together for the rest of this writing.

The facilitation of these realities can lead to a wide range of outcomes, two of which I view as central components of my conceptualization of patriarchal/sexist discourses, and which are particularly important for understanding ongoing and current oppressive sex-based and gender realities in societies in which patriarchal/sexist discourses are dominant, which includes Canada and the United States. The first of two sets of outcomes associated with realities that are informed by patriarchal/sexist discourses relate to how such discourses maintain or create *power*, *human value*, as well as *sex and gender expectation* asymmetries between males on one hand, and females on the other hand, in any personal or social context and interpersonal relationship. The second set of outcomes relate to how patriarchal/sexist discourses: position the control,

disadvantage, disempowerment, objectification, subordination, and dehumanization of females as unproblematic; and contribute to limiting the agency, choices, freedoms, and voices of females within cultural, economic, political, sexual, and any other social or personal context and interpersonal relationship. The second set of outcomes is meant to acknowledge the historical, ongoing, and new ways in which patriarchal/sexist societies subordinate and oppress females.

Hooks' (1984) theoretical discussion of the view of power in patriarchal/sexist societies is helpful in clarifying why sex-based and gender-based power asymmetries between males/men and females/women have been, and continue to be, considered as unproblematic by some people, regardless of their sex. Hooks' (1984) describes the dominant view of power in patriarchal societies as "power as domination and control" (p. 83), which, I contend, is central to many, if not all, discourses that promote hierarchy, domination, and subordination. This notion of power is accessible to, and can be internalized and externalized by, men and women because "like most men, most women are taught from childhood on that dominating and controlling others is *the* basic expression of power" (hooks, 1984, p. 85, emphasis in the original).

Regarding sex and gender expectation asymmetries that are central to patriarchal and sexist discourses, insights from feminist critical discourse analyst Michelle Lazar (2005; 2007) help to clarify why such asymmetries exist by pointing out that gender is commonly, but not necessarily consciously, understood in patriarchal/sexist terms within cultures and societies. Informed by several understandings of feminist theory, Lazar (2005; 2007) points out that the dominant view of gender has been based on, or influenced by, "patriarchal gender ideology," which is an ideology of gender that "divides people into two classes, men and women, based on a hierarchical relation of domination and subordination, respectively" (Lazar, 2005, p. 7). Lazar notes that patriarchal gender ideology has been represented as being natural because it is tied to

biological sex differences between males and females. This representation has supported the characterization of human qualities/traits as being 'feminine' or 'masculine.'

What are considered as 'masculine' human qualities are qualities (or traits) that have been socially connected to being a male human, and what are considered as 'feminine' human qualities (or traits) have been socially connected to being a female human. Consequently, in societies in which patriarchal/sexist discourses are dominant, the way in which gender is viewed by people may be through the lens of patriarchal gender ideology, irrespective of whether people are conscious of such gender-related views. Based on insights from feminist and other critical scholars, Lazar (2005; 2007) points out that the discursive reproduction of patriarchal gender ideology partly occurs because of people's internalization of the ideology, as well as the extent to which it is supported within the social environments in which they have developed and/or live. Thus, the reproduction of patriarchal gender ideology by people of any sex can be the result of both its dominance in one or more of their social environments and their internalization of it.

**The Genderization of Human Qualities**. Due to the problematic way that patriarchal gender ideology has influenced the dominant view of sex and gender (Lazar, 2005; 2007), I will refer to the characterization of human qualities/traits that are accessible to any human being, but which are gendered as 'feminine' or 'masculine,' as the *genderization of human qualities* in this dissertation. The genderization of human qualities is problematic for a variety of reasons, not the least of which is that it can help to (re)produce gender realities that subordinate girls and women to boys and men, respectively, in unintentional ways. Also, the genderization of human qualities can also restrict the potential of any person, regardless of their sex, to fully express their humanity throughout their lives. For instance, women and men may be judged negatively when expressing any human quality that does not conform to patriarchal/sexist gender expectations.

Our judgements about sexist/patriarchal identities for people of different sexes can place limitations on the expression of their humanity, whether they are intersex people, males, or females. For instance, there is a place for kindness (an example of a human quality that is often positioned as 'feminine') and assertiveness (an example of a human quality that is often positioned as 'masculine') in everyone's life, but some people may feel the need to avoid enacting these qualities in personal and/or social contexts, even when they need to, because of sexist/patriarchal sex and gender expectations that are expressed by others, or because they have internalized such expectations to the point that they are not aware they are trying to meet them. Also, limitations placed on people because of the genderization of human qualities tend to disadvantage females/girls/women more than males/boys/men because, as critical theorist and feminist Nancy Fraser (2007) points out, human qualities considered to be 'masculine' in patriarchal/sexist societies tend to receive more cultural value and importance.

***The Understanding of Sex and Gender in This Study***. Across various disciplines including medicine, neuroscience, and other biological sciences, sociology and other social sciences, psychiatry and psychology, (radical) feminist studies, and postmodern/queer gender studies, there have been different understandings of sex and gender, as well as of the various consequences experienced by human beings due (at least, in part) to sex and/or gender (see, for example, Butler, 2004; de Vries & Forger, 2015; Eagly & Wood, 2013; Fine, 2013; Fine et al., 2017; Griffin et al., 2020; Lee et al., 2016; Lehtonen & Parker, 2014; Lerner, 1986; Miller, 2014; Rahman et al., 2019; Sax, 2002; West & Zimmerman, 1987). As this dissertation study problematizes the influence of patriarchal/sexist discourses on various aspects of human existence that contribute to sex-based and gender injustices, I have worked with certain definitions of sex and gender that are relevant to the study. I employed an evolutionary and

physiological view of sex, the latter of which considers sex to be "the basic biological variable that distinguishes approximately half of the population from the other" (Miller, 2014, p. H781).

From an evolutionary perspective, humans whose bodies are organized to produce large gametes (that is, ova) are female, while humans whose bodies are organized to produce small gametes (that is, spermatozoa) are male (Lehtonen & Parker, 2014). The sex, or biological sex,[3] of a human being is determined by genes and hormones that "bring about sexual differentiation of the reproductive system" (Fine et al., 2017, p. 667) through complex events (Bashamboo et al., 2017). Every nongonadal cell in the human body has a sex that contributes to its nongonadal functions, and the nongonadal functions of the cells of different organs help to regulate important physiological processes in the human body, such as innate immunity and metabolism (see Miller, 2014). Thus, from a whole-body, physiological perspective, biological sex is one of the factors that is critical to understanding how to best meet the diverse health care needs of males and females at different stages of their lives (see, for example, Miller 2014; Rahman et al., 2019). Within the biological sciences literature, it has been estimated that less than 1% of human beings are born male or female with a classical intersex condition, or another difference/disorder of sex development (DSD) condition, which results in internal and/or external anomalies of the person's reproductive system (e.g., Bashamboo et al., 2017; Lee et al., 2016; Sax, 2002).

In this study, I used Lerner's (1986) definition of gender: namely that gender is "the cultural definition of behavior defined as appropriate to the sexes in a given society at a given time," (p. 238) and "a set of cultural roles" (p. 238) expected of male humans and female humans in their society. Lerner (1986) refers to the ways in which people are positioned within

[3] Throughout this dissertation, the terms sex, natal sex, sex category, biological sex, and biological sex category are used synonymously when referring to whether a human being is a male, a female, or a male or female with a classical intersex condition or other DSD condition.

patriarchal/sexist societies as the "sex-gender system," defining it as "the institutionalized system which allots resources, property, and privileges to persons according to culturally defined gender roles" (p. 238) based on whether those persons are males or females. In relation to my definition of patriarchal/sexist discourses, the sex-gender system not only involves people's conformity to gender roles based on their sex category, it also involves the expectation that males and females conform to ideas that align with the genderization of human qualities, and to other aspects of these discourses, based on their natal sex. Thus, within societies in which patriarchal/sexist discourses are subtly and overtly dominant, the sex-gender system functions in complex ways that are tied to the natal sex of a human being and to the interpretations of their sex category.

Within the last decade or so in North American, European, and other societies, the wider public has become increasingly aware of the reality that there have been, and continue to be, youth and adults who experience gender dysphoria and, as a consequence, might seek to identify as transsexual or transgender. Clinicians and researchers have discussed various reasons why a pre-adolescent, adolescent, or adult with gender dysphoria might socially and/or medically transition in order to be socially recognized as a person who was born into the other sex category (see Blanchard, 2005; Griffin et al., 2020; Lawrence, 2017; Littman, 2018). Also, some trans-identified people who suffer from gender dysphoria may desist or detransition, and then (re)identify with their natal sex, in order to be socially recognized as a person who was born into their biological sex category (see Cantor, 2020; D'Angelo, 2020; Griffin et al., 2020).

Partly informed by the work of some gender theorists, one conceptualization of gender identity is that it is a person's subjective sense of being a man or a woman, irrespective of their biological sex (see Griffin et al., 2020). In this dissertation, I do not conflate this view of gender identity with biological sex for people who do not have a classical intersex or other DSD

condition. I have three major reasons for this choice. Firstly, this conceptualization of gender identity, regardless of its intention, may reify patriarchal gender ideology by overlooking how the genderization of human qualities can limit the expression of a person's full humanity as a natal male or female. Secondly, the conflation of gender identity and sex may be contributing to unnecessary biomedical interventions[4] for vulnerable pre-adolescents and adolescents who suffer from gender dysphoria. It is an ethical concern when trans-identified youth receive one or more unnecessary biomedical interventions because such interventions, in general, expose them to serious physiological and developmental health risks, and may not alleviate mental health problems they experienced prior to receiving such interventions (see D'Angelo et al., 2021; Griffin et al., 2020). Finally, the conflation of gender identity and sex in some policies and laws, or through the interpretations of some policies and laws, can serve to undermine females'/girls'/women's sex-based human rights, as is evident in Canada, Scotland, and the United States (see, for example, Burt, 2020; Murray & Hunter Blackburn, 2019).[5]

**Some Significant Harms Informed by Sexist Discourses.** There are significant harms to people in general, and to women and girls in particular, which are (re)produced and maintained partly due to people's acceptance or internalization of certain aspects of sexist discourses present in Western and other societies around the world. Three areas of harm that are worthy of discussion are: (1) the ongoing reality of the sexual objectification of women and girls;

[4] Depending on the country, biomedical interventions for pre-adolescents and adolescents can include puberty blockers, cross-sex hormones, and surgeries (see Griffin et al., 2020).

[5] Females'/girls'/women's sex-based human rights are partly premised on the reality that males have some biophysical advantages compared to females, regardless of their subjective identities or attempts to decrease their testosterone levels (e.g., Burt, 2020; Hilton & Lundberg, 2021).

(2) the structural problem of violence against women (VAW[6]) perpetuated by men in intimate partner relationships; and (3) male perpetrated VAWG within the sex trade. While all three areas of harm are important for us, as human beings, to critically interrogate in relation to our own lives and our societies if we want human communities to be more just places for everyone, they do not represent the full scope of harms that are informed by patriarchal/sexist discourses.

***Sexual Objectification of Women and Girls.*** Sexual objectification of women and girls, as well as self-objectification by females/girls/women, are two realities which are partly influenced by sexist discourses. Borrowing from the theory and research of other feminist scholars, Barbara Fredrickson and Tomi-Ann Roberts (1997) describe sexual objectification as the treatment and view of girls and women as bodies or body parts that "exist for the use and pleasure of others" (p. 175). These scholars also describe self-objectification by girls and women as the process through which they become conscious of the "sexually objectifying ways" (p. 179) other people view them and, as a result, internalize those views to the point at which they begin to sexually objectify themselves (Fredrickson & Roberts, 1997).

Whether or not research studies over the past two decades have employed the framework of Fredrickson and Roberts' (1997) objectification theory in their analyses of the objectification of women and girls, it would be unfortunate for us to ignore the negative consequences of sexual objectification in a variety of contexts that have been identified and discussed by several researchers in recent years. Some examples of the harmful outcomes associated with the sexual objectification of women and girls include: women feeling pressured or coerced by male intimate partners to engage in sexual relations (Ramsey & Hoyt, 2015); and boys, girls, women *and* men

[6] In research reports by feminist scholars, feminist women's organizations, and humanitarian organizations, the acronym VAW has been used to denote "violence against women," and the acronym VAWG has been used to denote "violence against women and girls."

developing sexist, negative and unhealthy views about girls and women that is partially informed by their exposure to multiple types of media in which females are sexually objectified (see Ward's (2016) analytical review of over 100 studies published between 1995 and 2015).

***VAW in Intimate Partner Relationships.*** In Canada, the United States, and other countries, research-based evidence, and contextual analysis of research findings, demonstrate that intimate partner violence (IPV) within heterosexual relationships is gendered in that the victims of IPV are predominantly females/women, and the perpetrators of such violence are predominantly males/men (e.g., Chinkin, 2014; Dragiewicz & DeKeseredy, 2012; Dragiewicz et al., 2018; Myhill, 2015; Royal Canadian Mounted Police, 2015; Towns & Adams, 2016; Violence Policy Center, 2017). Researchers who acknowledge the role sexism plays in IPV have also discussed how factors that are rooted in sexism can contribute to people's acceptance of IPV and other forms of violence against women (e.g., Canadian Femicide Observatory for Justice and Accountability, 2019; Herrero et al. 2017; Jewkes et al., 2015). Regarding attitudes about IPV, Herrero et al. (2017) report on the results of their quantitative analysis of data from the large-scale, multi-country, World Values Study. Herrero et al. (2017) found that: respondents who were more accepting of violence in social relationships were more accepting of IPV; respondents who were more accepting of sexism were more accepting of IPV; and respondents who had positive attitudes about sexism and violence in social relationships were among those who had "the highest levels of acceptability of IPV" in the study (p. 363).

According to Andy Myhill (2015), a policing researcher and professor, there have been contradictory findings between general population surveys—over 200 of which have been published since 1990—and the findings from agency/clinical studies, with the results from general population surveys suggesting that there exists a gender symmetry among the victims

and perpetrators of IPV. Myhill (2015) notes that general population surveys "underrepresent the most frequently victimized individuals," (p. 356) while agency/clinical studies (e.g., research by criminal justice agencies or women's shelters) are given to samples mostly made up of IPV victims seeking help. This difference partly explains why general population surveys indicate a gender symmetry related to IPV, while agency studies have shown that "IPV is highly gendered, with women overwhelmingly the victims and men the perpetrators" (Myhill, 2015, p. 357).

Myhill (2015) also posits that the contradictory data related to IPV gender symmetry may be due to the kind of methodologies used in research surveys and studies about IPV. Myhill notes that one factor which may produce misleading results about gender symmetry amongst IPV victims and perpetrators could be whether, and/or how, researchers distinguish and measure two types of IPV that were conceptualized by Michael P. Johnson. One of the two types of IPV described by Johnson is known as “intimate terrorism,” which involves persistent and continuous coercive control of one partner by the other. The second type of IPV is known as “situational couple violence” or “situational violence,” which involves specific acts of violence or abuse that is done by either partner (Myhill, 2015, p. 356). Informed by scholarly insights, Myhill points out that a person tends to exact coercive control over their partner in various ways including, but not limited to, evoking generalized fear in their partner, denigrating them, and dominating them. In short, while situational violence “may be repeated, [it] does not have the same underlying dynamic of domination and control” as intimate terrorism does (Myhill, 2015, p. 357).

With a team of researchers, Myhill (2015) analyzed data associated with a subsample of the respondents who had participated in the 2008/2009 nationally representative survey known as the Crime Survey for England and Wales (CSEW). During their analysis, Myhill and his research team avoided combining both types of IPV behaviours and used a typology that

measured coercive control when they examined the survey data from the UK residents who had experienced IPV. Myhill's (2015) findings demonstrate the importance of measuring coercive control in studies of IPV because his team's specification that the abuse measured be "ongoing, denigrating and generative of fear" indicated that coercive control by intimate partners was "highly gendered" (p. 369). Moreover, their analyses indicated that abuse/violence based on coercive control was "more frequent and more severe than situational violence, more likely to result in physical and emotional injury…and its survivors are more likely to have sought help from a range of agencies" (Myhill, 2015, p. 369). Thus, consistent with the results of other research studies, Myhill and his team found that the worst forms of IPV (that is, examples of intimate terrorism) are committed by men against intimate partners who are women.

***VAWG in the Sex Trade.*** Researchers, scholars, and experts have exposed the ways in which the sex trade reifies sexism and facilitates male perpetrated violence against women and girls—from prostitution and sex trafficking (e.g., Coy, 2016; Farley et al., 2013; Geist, 2016; Jovanovski & Tyler, 2018; Rosario Sanchez, 2016) to pornography (e.g., Antevska & Gavey, 2015; Bridges et al., 2010). When considering prostitution, which primarily involves men buying sex from women, not even the consent of prostituting women mitigates the violence they experience, since women's consent to meet the demands of male sex buyers is constrained by a variety of factors (see Whisnant, 2017). In arguing why Amnesty International's 2016 proposal to support the full decriminalization of prostitution in countries where it is illegal would be unhelpful for eliminating the violence directed at prostituting women, attorney and scholar Darren Geist (2016) highlights how the consent given by most women to endure "exploitation and abuse" (p. 9) in prostitution is problematic because it is often based on women's "extreme

desperation and a history of abuse that makes selling their body seem acceptable" (p. 11), a history that, for some women, includes being sex trafficked when they were minors.

Research-based evidence of sexual harm, psychological harm, physical harm (including murder) and other harms to prostituting women, as well as sex trafficked women and girls, have been documented since the 1970s (see Farley et al., 2013). One large-scale research study that gives insight into the harms experienced by prostituting women was a study conducted by Melissa Farley, Ann Cotton, Jacqueline Lynne, Sybille Zumbeck, Frida Spiwak, Maria Reyes, Dinorah Alvarez, and Ufuk Sezgin (2004). In this study, 854 prostituting people were interviewed—the vast majority of whom were women—from nine countries across five continents, including Canada, the U.S. and Mexico. The respondents were asked about their experiences of sexual and physical violence prior to, during and/or after being in prostitution. Farley et al. (2004) also collected data from the respondents about: the impact of prostitution on their emotional and psychological health in terms of whether they suffered from post-traumatic stress disorder (PTSD); and the impact of prostitution on their physical health.

Farley et al. (2004) found that most of the respondents had experienced violence no matter the context in which they were prostituting, and they lived with, or survived, serious emotional, physical, and sexual injuries. Some of Farley et al.'s (2004) findings about the respondents' experiences before, or during, prostituting include the following: (i) "70% to 95% were physically assaulted in prostitution" (p. 56); (ii) "60% to 75% were raped in prostitution" (p. 56); (iii) "68% of 827 people in several different types of prostitution in 9 countries met the criteria for PTSD" (p. 56); and (iv) "65% to 95% of those in prostitution were sexually assaulted as children" (p. 56). Farley et al. (2004) also found that 89% of 785 respondents across the nine countries who were in prostitution at the time of the study wanted to leave prostitution.

### *Liberal Discourses*

During the 20th century, some discursive meanings of specific centuries-old ideas about what liberalism is within political and philosophical contexts became dominant within Western societies, which was partly due to a rejection of totalitarianism (Bell, 2014). I will refer to liberal discourses as those discourses that have been influenced by twentieth-century ideas of liberalism. A few principles that have been associated with liberal discourses, including *liberal feminist discourses* and *neoliberal discourses,* include equality of opportunity for all people, individual agency and autonomy, freedom of choice, and the ideal that any person's advancement in their society should be based on merit, regardless of their social location (see, for example, Bell, 2014; Johnson, 2014; Littler, 2013; Pinto & Coulson, 2011).

While the liberal ideal of meritocratic advancement in a society may be appealing in a theoretical sense, in reality this ideal is unhelpful and problematic for achieving gender justice partly because "meritocratic thinking eliminates any discussion or acknowledgement of [male] privilege, and denies the existence of [gender] inequity" (Pinto & Coulson, 2011, p. 68). In discussing some of the findings from their research study about curricular resources for financial literacy used in Canadian schools, Pinto and Coulson (2011) demonstrate that "women may have *equal* opportunity to…earn and save money, but not *equitable* opportunity [to do so] given the [socially gendered] realities they face" (p. 70; emphasis in original). The examples of gendered realities Pinto and Coulson discuss range from the sexist social and cultural norms and expectations that are internalized by some women and men regarding women's participation in work and family life (which, in turn, can undermine their ability to build wealth and develop financial autonomy over the course of their lives), to the workplace policies that can result in women receiving lower incomes than men when performing the same type of work.

According to feminist legal theorist Tracy E. Higgins (2010), as well as other feminists who value (at least some) liberal ideals, a major limitation of liberal discourses is the support of societal interventions that seek to ensure the equality of people within the public sphere. As Higgins points out, this limitation is noteworthy because the private sphere of human lives can be the place where females are particularly vulnerable to experience, as well as internalize and reproduce, gender subordination. This reality can serve to maintain women's experiences of gender inequality and restrictions on their freedom, choice, and agency within sociocultural institutions that are influenced or structured by patriarchal/sexist discourses, such as patriarchal family units and religions that are centered around male-identified gods.

In her discussion of several feminist critiques of liberalism, Higgins (2010) indicates that unequal power relations between people within the public realm are prioritized over unequal power relations that exist in people's private lives. Moreover, Higgins (2010) points out the problematic way in which individual choice, autonomy, and agency are characterized within liberalism, stating that "liberal notions of autonomy posit an unrealistically unencumbered individual" (pp. 68-69) in which social, cultural, and other factors that influence human choices are ignored or downplayed. This limited idea of autonomy and choice for Higgins (2010), and other feminists who value some aspects of liberalism, obscures the reality that within sexist societies some women's autonomy and choices in the public and private spheres of life can be limited to a greater degree than men's autonomy and choices in both areas, which is partly due to the "internalized, socially-defined constraints on women's identity" (p. 70).

Unlike various radical/revolutionary feminisms, such as socialist feminism (see, for example, Weiler, 2009), liberal feminism has been criticized for its lack of commitment to transforming societal structures, as well as its lack of emphasis on the impact of sexism on

people's gendered, classed, and racialized realities. For instance, hooks (2000) refers to liberal feminism as "reformist feminism" (p. 5) and acknowledges that it has become a more accepted approach to feminist politics within the U.S. mainstream media and other areas of American society. One of the reasons hooks (2000) gives for why liberal/reformist feminism has become more accepted and visible in the United States from the beginning of the second wave feminist movement (that is, from the 1960s and 1970s onwards) is that reformist feminists focused "primarily on equality with men in the workplace" (p. 4) without focusing on restructuring the racist and sexist social structures of American life, as well as the classist capitalist economy of the U.S., to the extent that revolutionary feminist activists, like herself, have sought to do.

There is no question that some liberal discourses, including liberal feminist discourses, have helped to deepen our understanding of the importance of working for gender and other forms of equality in different aspects of our sociopolitical realities, as well as the importance of acting upon such understanding in positive ways within the public and private spheres of our lives. For instance, liberal discourses have helped us to value the ideal that all citizens in a democracy should have equal access to quality education, as well as economic and other social opportunities, to build meaningful, dignified, and independent lives. However, there are oversights inherent in liberal discourses of equality and choice that tend to downplay the social constraints that people, particularly girls and women, confront in their personal lives and societies. Moreover, such oversights can function to constrain our understanding of the extent to which sexism and associated gender injustices are linked, as well as our ability to critically reflect upon how we are contributing to, or (re)producing, such sex and gender injustices.

### *Neoliberal Discourses*

In this dissertation, neoliberal discourses refer to ideologies, social practices, power relations, and other discursive realities associated with neoliberalism. Feminist economics scholar Stephanie Seguino (2011) describes neoliberalism as "the set of macroeconomic policies set in motion since the early 1970s" (p. 23) that has sought to construct and reinforce economic policies, practices, and processes which support market liberalization for businesses and capitalists. Some of the major components of neoliberalism that Seguino (2011) describes are: (i) five central principles of neoliberal policies, one of which is "financial liberalization," that is, the "elimination of restrictions on cross-border movements of money" (p. 24); (ii) the processes of "deregulation," which is "the elimination of regulations on economic activity, as well as in areas such as anti-discrimination and the environment" (p. 24); (iii) the "flexibilization of labor markets, including the elimination of trade unions" (p. 24); and (iv) the "privatization of basic social services and amenities" (p. 24) that can undermine the public good.

People influenced by neoliberal discourses argue that its principles, practices, and policies for economic market liberalization, along with the limiting of a government's role in its country's economic affairs, will benefit everyone. However, using statistical data and graphical representations of the effects of neoliberal practices in countries across the globe since the 1960s, Seguino shows that the supporters of neoliberalism have not been proven right thus far. For example, Seguino (2011) presents data which shows that the ratio of incomes of the richest 20 percent of households compared to the poorest 20 percent of households went from 30:1 in 1960 to 103:1 in 2005 in countries around the world. Seguino also notes that the rise of global income inequality accelerated during the 1980s when neoliberal policies were adopted by more countries. The increase in income inequality between countries over the last few decades has

also occurred within countries. For instance, Seguino (2011) cites statistical evidence from other sources that shows that the ratio of the wages of Chief Executive Officers (CEO) to the average wages of (non-CEO) workers in the U.S. increased from 42:1 in 1980 to 500:1 in 2008.

Seguino (2011) describes the subprime mortgage crisis as a factor that induced the 2008 economic recession in the U.S. In describing the personal and financial losses that people of colour and females had endured during the 2008 recession as a consequence of subprime mortgages, Seguino (2011) identifies how certain neoliberal principles, policies, and practices served to maintain economic injustices in the U.S. along the lines of 'race'/ancestry, as well as sex and gender. Seguino notes that deregulation, as well as financial liberalization in the U.S. and other OECD[7] countries, can be considered as two of the reasons why banks merged, which in turn created reduced competition. The resulting larger banks preferred to fund more wealthy borrowers, excluding the "smaller and less collateralized segments of the population, [which were] largely women" (Seguino, 2011, p. 37). Seguino (2011) points out that the preference for wealthier clients did not stop such banks from offering disadvantageous subprime home loans to some women and people of colour which, in turn, led to their losses during the 2008 recession.

Another aspect of neoliberal discourses that undermines economic justice and social justice (including gender justice) is the emphasis on individualism (Porter, 2012). When individualism is positioned as a major part of the solution to financial and socioeconomic problems, some working-class people may come to believe that their experiences of such problems can be significantly changed only through their individual choices and agency.

[7] OECD is an acronym for the Organisation for Economic Co-operation and Development. The OECD currently supports the economic policies and trade among 34 member countries around the world including Australia, Canada, Chile, France, Germany, Japan, Mexico, Poland, the United Kingdom and the United States of America.

However, empirical, and analytical, research findings indicate that structural social and economic injustices that are partly due to the impact of neoliberal discourses on a country's economy, cannot be easily solved just by the choices and agency of individual workers, including those in Canada (e.g., Block & Galabuzi, 2011; Pinto & Coulson, 2011; Porter, 2012).

### *Postfeminist Discourses*

Sexist discourses in North American and other capitalist societies are, in some ways, supported by *postfeminist discourses.* Researchers concerned about oppressive gender realities have described postfeminist discourses in different ways. I base my understanding of this type of societal discourse on insights from several feminist scholars whose writings have identified measurable associations of these discourses in people's lived experiences (e.g., Brown-Bowers et al., 2015; Lazar, 2005, 2007; Pomerantz et al., 2013). Based on this knowledge, I define postfeminist discourses as collections of ideologies, practices, power relations, and so on, which are associated with the belief that the political struggles of second wave feminism in capitalist and industrialized countries are no longer necessary in many aspects of people's private and public lives because in such societies: (1) a person's individual choices and actions are sufficient for their cultural, economic, political, sexual, and other social and individual freedoms and rights; and (2) sexism, androcentrism, and other forms of patriarchal gender oppression that are, and contribute to, gender injustices, no longer need to be addressed and/or viewed as problematic once certain indicators of gender equality have been achieved for women and girls.

Two of the major problematic tenets of postfeminist discourses are the insistence that sexism is a thing of the past and that gender equality rights for women and girls that have been gained are stable and uncontested (Lazar, 2005). Yet, gender equality and other human rights for women and girls that have been achieved in North American and other Western countries are not

secure, as there continues to be cultural, economic, legal, and political realities that contribute to the insecurity of such rights, including: the undermining of women's and girls' sex-based human rights (e.g., Burt, 2020; Murray & Hunter Blackburn, 2019); and the ongoing structural and sexist-based impediments to women's career achievements and abilities to build wealth over the course of their lives (e.g., Fels, 2004; Lips, 2013; Pinto and Coulson, 2011). Also, women's right to work in a safe and harassment-free environment is not a guaranteed reality, as there continues to be evidence of women experiencing sex stereotyping and gender harassment (e.g., Leskinen et al., 2015) and sexual harassment (e.g., Collier & Raney, 2018; North, 2016) at work.

Another problematic but central tenet of postfeminist discourses is its insistence that heterosexual women's empowerment is reliant on their sexuality (Lazar, 2007; Heldman & Wade, 2011). The postfeminist conflation of female empowerment with female sexual freedom and sexuality is problematic because it tends to restrict, rather than expand, women's authentic development of healthy forms of sexual agency and desire, while maintaining sexist gender asymmetries in romantic relationships. In discussing their findings of a study about 39 Canadian young women's construction of their sexuality within heterosexual relationships with men, Brown-Bowers et al. (2015) found that some participants indicated the postfeminist imperative to consistently "demonstrate [their] sexual availability, desirability and competence" (p. 332) within their romantic relationships. While the participants in Brown-Bowers et al.'s study did articulate sexual desire, it was constrained by a postfeminist discourse that mirrored sexist views about heterosexuality, and was constrained by neoliberal notions of choice, which together undermined the participants' sexual freedom compared to that of their male partners.

***Revolutionary Feminist Discourses***

I primarily (although, not exclusively) base my understanding of revolutionary feminist discourses on some of hooks' (2000) knowledge about revolutionary feminism, as well as on my conceptualization of patriarchal/sexist discourses. One central aspect of revolutionary feminist discourses is the ongoing development of a revolutionary feminist consciousness by a person of any age, sex and gender, socioeconomic class, and other categories of social difference, which contribute to their social location in society. As stated earlier, the following five opportunities can help each of us to develop (or deepen) our revolutionary feminist consciousness:

- becoming more conscious of, as well as developing a critical understanding of, how sexist/patriarchal thinking and behaviour are reflected in culture, religion, economic structures, political structures, and other important aspects of human life;
- recognizing how we might have internalized different aspects of sexism and patriarchy through the interpretation of our own sex, the conscious and unconscious construction of our own identities, and our interpretation of other people's sex and identities;
- recognizing how we are (re)producing sexism and patriarchy in our lives and society;
- seeking to change our own thinking and behaviour in relation to ourselves and others by resisting the influence and impact of sexism/patriarchy in our own lives; and
- whenever possible, working with others to end the influence and impact of sexism/patriarchy in our society and the world-at-large, which, I would add, should be sought in non-coercive ways that support truth and contribute to justice for all people.

Another important aspect of revolutionary feminist discourses is the view of power. Hooks (1984, 2000) argues that people in patriarchal, capitalist societies need to challenge the dominant view of power as being expressed through the domination and control of others. From

a revolutionary feminist discursive perspective, all people can benefit from examining whether their conscious or unconscious idea of power is "power as domination and control" (hooks, 1984, p. 83), and then work to replace it with a notion of power that does not (re)produce ancestral/'racial,' socioeconomic class–based, sex and gender–based, and other socially-based hierarchies that involve domination and subordination. In short, seeking to share power in ways that counter such oppressive hierarchies is important within revolutionary feminist discourses.

In addition to replacing the dominant view of power in sexist/patriarchal societies with a revolutionary feminist view of power, people of any sex and identity can benefit from developing a revolutionary feminist approach to empowerment. I posit that a revolutionary feminist view of empowerment is the type of empowerment that reflects a person's ability to: (i) enact power that is not based on domination or subordination in any social or personal context (hooks, 1984); (ii) enjoy, and help to create for others, safe public and private environments in which they and others can begin or continue to move towards positive self-actualization and a healthy positive sense of self; (iii) be independent and autonomous, as much as is possible, in all aspects of their lives; and (iv) be able to make choices that resist and challenge the influence and impact of sexist/patriarchal discourses, as well as other discourses of hierarchy, domination, and subordination, on their core or social identities, power relations, interpersonal relationships of any kind, social practices, and so forth. This view of empowerment, in addition to sharing power with others in revolutionary feminist ways, has the potential to impact our choices and actions so that we can be better able to build healthier and more just relationships, social practices, identities, power relations, etc., as well as experience a deeper level of self-actualization, meaning, love, and other life-enhancing experiences, in our lives and society.

## Other Concepts that Informed the Feminist CDA Used in This Study

In addition to the concept of discourse used in this study, there are several other concepts that were central to my feminist critical discourse analysis (feminist CDA) of the SJM curricular data examined in the study. These additional central concepts are gender equality, gender justice, as well as social injustice and gender injustice. I will briefly discuss each concept below.

### *Gender Equality*

Within a legal and human rights framework, a strong conceptualization of *gender equality* is that which has been articulated by the United Nation's Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW). Alda Facio and Martha Morgan (2009) give an in-depth description of three principles underlying CEDAW's definition of gender equality: "the principle of nondiscrimination, the principle of state obligation, and the principle of substantive equality–[that is,] equality of results" (p. 1134). Of the requirements for gender equality that CEDAW advocates, there are two that I consider to be vital to ensuring gender equality for all people. Firstly, CEDAW requires that countries promote "(1) actions to achieve equality of opportunity between men and women, and (2) actions to correct the inequalities of power between men and women" (Facio & Morgan, 2009, p. 1146). Secondly, CEDAW obligates nations "to take all appropriate measures to modify socio-cultural patterns and stereotypes, and to eliminate prejudices and cultural practices based in sexist ideas" (Facio & Morgan, 2009, p. 1146). Facio and Morgan consider this obligation to be important because sexist gender norms for men and women are socially constructed and culturally reproduced.

### *Gender Justice*

Working towards achieving gender justice in a wide variety of social contexts is an essential part of the struggle to create a more socially just world. For feminist and critical

theorist Nancy Fraser (2007), gender justice is achieved when males/men and females/women in a society interact with one another as peers (p. 27). Fraser identifies the principle underlying such interactions as participatory parity. This principle is based on her initial two-dimensional conception of both *gender* and *justice* that critically problematize sexism and patriarchy. Fraser (2007) believes that in order to continue to counter females'/women's subordination to males/men within androcentric and sexist societies, including Western societies, we need to view gender as having both economic class-like traits—as realized through how females/women are disadvantaged in the division between paid and unpaid labour, as well as within the paid labour force—and having status-like traits. The status-like traits of gender are cultural traits associated with patriarchal constructions of masculinity and femininity. Fraser (2007) notes that because traits associated with masculinity are privileged and more valued than those coded as feminine, females/women suffer "status subordination" (p. 26) in comparison to males/men, which is instantiated in different ways—from experiencing sexual harassment and sexual assault, to being objectified and represented in stereotypical ways through media.

Gender justice, having as its foundation the principle of participatory parity, necessarily involves "theorizing both the gendered character of the political economy and the androcentrism of the cultural order, without reducing one of them to the other" (Fraser, 2007, p. 25). In other words, gender justice must address distributive justice issues that relate to the class-like traits of gender and the cultural recognition of males/men and females/women in a society that relates to the status-like traits of gender. With respect to distributive justice, gender justice must include a concern for economic inequities and injustices (e.g., poverty and economic exploitation) that females/women disproportionately experience. Regarding the cultural recognition of a person in a society, Fraser suggests that gender justice requires: a rejection of status traits that are based on

sexist gender norms; and a focus on addressing situations in which females/women are not full partners with males/men in various dimensions of social life.

### *Social Injustice and Gender Injustice*

As I indicated in Chapter 1 of this dissertation, I define *social injustices* as problematic and oppressive sociopolitical realities that result from, or are (re)produced by, social inequalities (e.g., racial inequalities, income inequalities, etc.) and forms of social oppression (e.g., racism, socioeconomic classism, etc.). *Gender injustices* are specific types of social injustices that are consequences of sex and gender inequalities, as well as forms of sex and gender oppression (e.g., sexism/patriarchy, lesbophobia, homophobia, etc.). My definition of gender injustices is based on Fraser's (2007) conceptualization of gender justice, as well as specific feminist knowledge about the nature and consequences of sexism/patriarchy in people's everyday lives and their society's social structures and institutions (e.g., hooks 1984, 2000; Johnson, 2014; Lerner, 1986). The reason I include sex and gender in this definition of gender injustices is to explicitly acknowledge that a person's experience of a gender injustice is related to the culturally stereotypical expectations of, and/or beliefs about, members of their sex category. This acknowledgement is meant to align with the definition of gender used in this study. As I have done thus far in this dissertation, whenever I only refer to gender injustices associated with sexism, I mean social injustices which are oppressive sex-based and gender-related realities.

## Types of Knowledge Relevant to the SJM Curricula of This Study

Some principles of critical education and critical pedagogy have informed the teaching practices, curricular goals, and other aspects of critical mathematics education amongst some of the leading educators in the field (see Wager & Stinson, 2012). During my analysis of the SJM curricula developed by the participants of this study, I found it helpful to understand three types

of knowledge that a leading critical mathematics educator (Ole Skovsmose) and a leading critical pedagogy scholar (Peter McLaren) have posited as being important to critical education, and critical pedagogy, respectively. The types of knowledge that both Skovsmose (2012) and McLaren (2009) discuss are those described by German social theorist Jürgen Habermas in his book *Knowledge and Human Interests.* After summarizing these two scholars' descriptions of Habermas' philosophical views about knowledge, I will define three types of knowledge that I found to be relevant to my analysis of the participants' SJM curricula, which are partly informed by how Habermas' views on knowledge are taken up in critical education and critical pedagogy.

Seeking to explain why the development of a critical stance within mathematics education was ignored for some time by other critical educators, Skovsmose (2012) describes Habermas' ideas about knowledge that had informed part of the development of critical education. Specifically, Skovsmose highlights Habermas' view that human knowledge is constituted by human interests, which was a position that represented a pushback against the positivist understanding of knowledge within the natural sciences. Skovsmose (2012) notes that the three "knowledge-constituting interests" (p. 39) which Habermas described were: (1) a "technical" interest (p. 39), which constitutes the knowledge produced and used within the natural sciences; (2) an interest in "understanding" (p. 39), which constitutes the knowledge produced and used within the humanities; and (3) an interest in "emancipation" (p. 39), which constitutes the knowledge produced and used within the social sciences. Skovsmose (2012) notes that while emancipation was an important part of many forms of critical education, applying an emancipatory stance in the field of mathematics—which was, in his view, predominantly concerned with technical interests—seemed to be contradictory to many critical

educators before the work that he and other people had done in developing some approaches to critical mathematics education as a subfield of mathematics education.

McLaren's (2009) discussion of Habermas' categorization of knowledge adds further insight about the epistemological concerns of critical pedagogy. Seeking to relate Habermas' insights about knowledge to classroom teaching practice, McLaren (2009) describes Habermas' categorization of the three human interests associated with human knowledge production and usage with the terms "technical knowledge" (p. 64), "practical knowledge" (p. 64) and "emancipatory knowledge" (p. 64) respectively. McLaren (2009) defines technical knowledge as knowledge "which can be measured and quantified" (p. 64) and notes that it is based on "hypothetico-deductive or empirical analytical methods" (p. 64) which are used in the natural sciences. In addition to not typically being quantifiable, McLaren (2009) describes practical knowledge as being knowledge that is "generally acquired through *describing and analyzing social situations historically or developmentally*, and is geared toward helping individuals understand social events that are ongoing and situational" (p. 64, italics in original).

With respect to the third type of knowledge that is important to critical pedagogy, McLaren (2009) describes Habermas' emancipatory knowledge as being knowledge "which attempts to reconcile and transcend the opposition between technical and practical knowledge" (p. 64). McLaren (2009) clarifies this description of emancipatory knowledge as follows:

> Emancipatory knowledge helps us understand how social relationships are distorted and manipulated by relations of power and privilege. It also aims at creating the conditions under which irrationality, domination, and oppression can be overcome and transformed through deliberative, collection action. In short, [emancipatory knowledge] creates the foundation for social justice, equality, and empowerment. (p. 64)

This description of emancipatory knowledge suggests that a SJM curriculum, which partly seeks to help students develop their ongoing critical consciousness about social injustices, needs to provide them with consciousness-raising learning opportunities through which they can (re)produce and use emancipatory knowledge to identify, analyze, understand, and change gender and other social injustices that impact their own and/or other people's lives.

In adult educational contexts, the positionalities of students, the emotional aspects of students' learning, and a variety of other factors, can serve to limit the construction of emancipatory knowledge (see, for example, hooks, 1994; Tisdell, 1998). This can also be true for middle school and high school students who engage with SJM curricula, as well as with social justice curricula taught in other school subjects. Yet, the cumulative impact of engaging with SJM curricula has the potential to strengthen adolescents' abilities to build and use emancipatory knowledge during, and beyond, the consciousness-raising learning opportunities of such curricula when SJM teachers seek to support their abilities to do so in age-appropriate ways, and with effective SJM teaching strategies (see, for example, Gutstein, 2006; Kokka, 2019).

**Sociopolitical, Experience-based, and Mathematical Knowledge**

In order for middle school and high school mathematics learners to be able to build the kind of emancipatory knowledge they need to begin or continue to develop a critical consciousness about gender injustices informed by sexist/patriarchal discourses when they engage with SJM curricula, they need to be able to use and/or (re)produce sociopolitical knowledge, experience-based knowledge, and mathematical knowledge, preferably in a balanced way. While scholars define these types of knowledge differently, I conceptualized them in broad terms in order to analyze and more fully understanding the extent to which the SJM curricula that were contributed to this study have revolutionary feminist consciousness-raising potential.

In this dissertation, my use of the term *sociopolitical knowledge* refers to knowledge that has the potential to help a person understand social and political realities in the human world that are, and are not, oppressive. Moreover, I view sociopolitical knowledge as knowledge that can enable people to understand socially constructed realities that involve human interactions and relations, such as cultural realities and economic or financial systems. Thus, cultural knowledge, economic or financial knowledge, and other types of knowledge associated with socially constructed realities are included in my use of the term sociopolitical knowledge. I use the term *experience-based knowledge* to refer to knowledge that is produced and/or used by a person who is coming to know and understand their own and/or other people's experiences of one or more sociopolitical realities in the human world, which may or may not be oppressive realities. When I use the term *mathematical knowledge*, I am referring to technical knowledge that is based on mathematical concepts and ways of thinking that have the potential to enable a person to interpret and better understand sociopolitical and non-sociopolitical realities in the human world.

It is my view that no matter what social injustices are represented or addressed in SJM curricula that have been developed for middle school or high school learners, well-constructed SJM curricula are ones that provide adolescents with opportunities to utilize and/or (re)produce mathematical knowledge, sociopolitical knowledge, and experience-based knowledge in ways that can enable them to develop emancipatory knowledge as a result of their engagement with those curricula. However, I do not mean to imply that every student who engages with a well-constructed SJM curriculum will identify, critically analyze, understand, and/or move towards changing the social injustices addressed in it through individual or collective actions. Due to how a well-constructed SJM curriculum is presented, taught, and/or facilitated with middle or high school math students, and based on the extent to which oppressive discourses may be

influencing them, students may not necessarily develop emancipatory knowledge in ways that could help strengthen their critical consciousness about: gender and other social injustices; how such oppressive sociopolitical realities are maintained or (re)produced; and how they, as individuals, can resist and challenge them. Nonetheless, it is important that adolescents' emancipatory knowledge of, and critical consciousness development about, gender and other social injustices be supported through well-informed and well-constructed SJM curricula.

## Concluding Remarks

To analyze the data collected for this dissertation study and seek to effectively answer its central research question, I needed to draw upon a multi-faceted conceptual framework. This conceptual framework includes the concepts of patriarchy, sexism, revolutionary feminist consciousness, and discourse, which were described in Chapter 1 of this writing, as well as the concepts defined and discussed in this chapter—from several discourses of hierarchy, domination, and subordination, to the types of knowledge that can potentially help middle school and high school students recognize, as well as better understand, gender and other social injustices through their exploration of SJM curricula. After describing certain methodological aspects of this doctoral study at the beginning of the next chapter (that is, Chapter 3), I will discuss the analytical framework that allowed me to analyze the SJM curricular data of the study.

# CHAPTER 3

# METHODOLOGY

## Recruitment Strategies and Participants

Using four criteria, I sought to recruit at least three K-12 or postsecondary school mathematics educators to be participants in this research study. One criterion I used was that the potential participants were to be educators who understood and supported the curricular goals of critical mathematics education in general. A second criterion was that the educators were to have had experience developing and/or teaching SJM curricula. A third criterion was that the potential participants were to have developed, or be willing to develop, a SJM lesson, unit, or project for K-12 or post-secondary mathematics learners (including pre-service teacher candidates) which could provide students with the opportunity to employ mathematics as an interpretive tool to specifically analyze sexism and/or associated gender injustices. The fourth criterion was that the curriculum each math educator was willing to share for analysis in this study addressed sexism and/or associated gender injustices that occur in Canada or the United States. With this last criterion, I sought to interrupt the postfeminist idea that sexism and associated gender injustices happen rarely or, if they do, are not problematic in these countries.

Using the four aforementioned criteria, I invited mathematics educators to be participants in the study through a two-step process. Firstly, I identified a total of 15 mathematics educators in Canada and the U.S. who, at the time of contact, were working as middle school math teachers or as university math education instructors, professors and/or postdoctoral research associates. I considered these educators to be potential participants based on knowledge of their work that I had acquired before and after conducting several literature reviews of published SJM curricula

and scholarly texts about critical mathematics education. Secondly, I emailed each of the educators an invitation to be a participant in the study. The email to each educator included an attached document that specified: the purpose and goals of the study; the reasons I considered them to be a potential participant; how the project might benefit them; and what they would be asked to do during the study if they became a participant in it.

The first two (of three) educators who became participants in the study were recruited through the aforementioned process, which represents a purposive sampling strategy. Charles Teddlie and Abbas Tashakkori (2009) define purposive sampling as "the process of selecting units (e.g., individuals and institutions) based on specific purposes associated with answering a study's research questions" (p. 343). At the beginning of the data collection phase, the third participant of the study was recruited based on information provided to me by one of the first two participants following an introductory interview. This successful recruitment resulted from the purposive sampling strategy known as snowball sampling in which a researcher (or a group of researchers) recruits more participants to their study by "using informants or participants to identify additional cases for inclusion in the study" (Teddlie & Tashakkori, 2009, p. 345).

The three confirmed participants initially signed an Informed Consent Form that included a guarantee that I would do my utmost to protect their real identities. I sought to maintain the participants' anonymity in various ways during the study including, but not limited to, referring to each participant by a pseudonym in all written documents I produced during the data collection and analysis phases of the study, as well as using their pseudonym when speaking to them during our audio-recorded interviews. After each participant read a report that I had written about the findings of my analysis of their SJM curriculum during our member-checking interview, I asked them whether they would like me to use their real names during my oral or

written publications about the study, including this dissertation. I did this because one participant contributed a published SJM curriculum to the study and another participant contributed a SJM curriculum that was published after our two introductory interviews, but before our member-checking interview. After each member-checking interview, I offered this choice to each math educator and all three of them indicated, in writing, that they no longer wished to remain anonymous in any of my public communications about this doctoral study. Thus, I have chosen to refer to the participants by their real names throughout this dissertation.

One female and two male SJM educators became participants in this study. When the research study began: the female participant was primarily teaching Grades 7 to 8 math classes; one male participant, who was working as a school board instructional coordinator in science and technology education, had been a high school math teacher previously; and the other male participant, who was a teacher at a Grades 7 and 8 middle school, was teaching multiple subjects, one of which was mathematics. The two male participants were both working and living in Canada throughout the duration of the study, while the female participant was working and living in the United States. In what follows, I reveal each participant's identity and share a brief description of their personal background and professional activities as of June 2018.

**Flannery Denny (Flannery)**

Flannery is an American citizen of European ancestry. She grew up mostly in America in the state of New York. At the time of our first and only introductory interview, Flannery had been teaching Grades 6 to 8 math classes at a pre-Kindergarten to Grade 8 independent, progressive school in New York. She had been teaching there since 2009. As of the 2017 to 2018 school year, Flannery had not taught Grade 6 math classes since 2015. Part of Flannery's school's mission is to ensure that its students engage meaningfully with social and environmental

justice issues, as well as develop a spirit of activism that results in peaceful and positive actions. Flannery's curriculum development and pedagogical practices at the school reflect this aspect of its mission, as is evident in her discussion about a SJM unit she had designed and taught (see Denny, 2013). In addition to her teaching duties at the school, Flannery was the Math Specialist & Math Special Events Coordinator since 2009, and she served as the Sustainability Curriculum Project Coordinator since 2015. Prior to 2009, Flannery taught Grade 8 mathematics classes for two years at a different school, and she taught high school mathematics courses for four years.

**Anthony Persaud (Anthony)**

Anthony was born and grew up in Ontario, Canada. He is a Guyanese Canadian male. As he indicated in the first of our two introductory interviews, Anthony had worked in the pharmaceutical industry for ten years before deciding to become a mathematics secondary school teacher. Anthony taught high school mathematics for seven and a half years. Due to his desire to encourage teenagers' interest in mathematics, he primarily taught Grades 9 and 10 applied mathematics courses and Grades 9 to 12 vocational mathematics courses during his high school teaching career. Within such courses, Anthony wanted to teach mathematics through social justice contexts after learning about SJM education at a workshop he had attended during his pre-service teacher education program. Anthony has co-authored a chapter essay that disrupts the dominant view of critical thinking in mathematics education and reflects on the value of engaging high school students with SJM curricula (see Fish & Persaud, 2012). He has also co-written a textbook for Grade 9 applied mathematics in Ontario. When I had met him for our first introductory interview, Anthony had been the Acting Instructional Coordinator for science and technology education at a school board in Ontario, Canada, for over a year. According to Anthony, two of the duties he performed in this position were: encouraging the use of inquiry in

the classroom amongst K-12 science and technology teachers; and overseeing events which occurred at different schools that were intended to help students engage with, learn, and be creative in science and technology through hands-on activities and projects. As of the 2017 to 2018 academic year, Anthony was teaching pre-service teacher education courses at a university in Ontario, Canada while pursuing a doctoral degree in the field of education.

**David Stocker (David)**

David is a Canadian male of European ancestry who grew up in Ontario, Canada. For most of his teaching career, which has spanned more than twenty years thus far, David has taught at an alternative middle school for Grades 7 and 8 students in Ontario. Since David began teaching at this public school, he has typically taught a United Nations class and the following subjects: Grade 8 mathematics; Grades 7 and 8 science; Grades 7 and 8 health; Grades 7 and 8 physical education; Grades 7 and 8 media studies; and Grades 7 and 8 dance. David had also taught Grade 7 mathematics classes at this school. As David noted in our first of two introductory interviews, the majority of his math lessons involve social justice issues. In fact, David uses social justice and anti-oppressive frameworks for teaching the Ontario curriculum in all of his classes, which mirrors his school's social justice and peace-oriented curricular goals, as well as its educational philosophy. Over the course of his career thus far, David has contributed to the field of critical mathematics education through published academic writing, including articles and book chapters. David has also written a curriculum resource book for middle school math teachers in which he shares samples of the SJM lessons he has developed and taught to his students (see Stocker, 2006). This curriculum resource book demonstrates how mathematical concepts can be used as interpretive tools through which social injustices can be recognized, understood, and challenged by middle school learners in practical and meaningful ways.

## Data Collection

### Interviews

At the beginning of the data collection phase, I conducted one or more semi-structured interviews with each participant, which I refer to as the *introductory interviews.* The purpose of the introductory interviews was four-fold. Firstly, I wanted to learn about the participants' experiences of teaching and developing SJM curricula, as well as the factors that might have contributed to their interest in SJM education in general. Secondly, I wanted to know each participant's views about sexism and associated gender injustices, the relationship between sexism and associated gender injustices, and the ways by which mathematics could be used as one set of interpretive tools to help students understand sexism and/or associated gender injustices. Thirdly, the introductory interview provided me with the opportunity to ask each participant about a SJM curriculum they could contribute to the study for analysis that addressed sexism and/or associated gender injustices in some way. Finally, I wanted to know each participant's views on different aspects of their SJM curriculum. Since the final decision about the SJM curriculum that Anthony and David would contribute to the study for analysis was made after my first introductory interview with each of them, I conducted a second introductory interview with each educator in order to meet the fourth goal of the introductory interviews. Flannery and I had agreed that I would analyze her published SJM curriculum prior to our introductory interview. Thus, I conducted only one introductory interview with Flannery.

All introductory interviews were audio-recorded and fully transcribed because I thought that the participants' answers to the questions posed would inform my feminist CDA of their SJM curriculum somehow. I conducted Flannery's introductory interview through a Skype video call that lasted for about 42 minutes. While I met with Anthony in person at his place of

work to conduct our first introductory interview, we spoke via Skype for our second introductory interview. The duration of Anthony's first and second introductory interview was approximately 50 minutes and 25 minutes, respectively. I also conducted the first introductory interview with David at his place of work and the second introductory interview via Skype. The duration of David's first and second introductory interview was about 61 minutes and 28 minutes, respectively. See Appendix A for the common introductory interview questions that were posed.

Following my analysis of each participant's SJM curriculum, I conducted a *member-checking interview* with each of them after I had provided them with an initial report of my findings by email. One goal of the member-checking interviews was to receive each participant's feedback about my understanding and interpretations of their SJM curriculum. Another goal of each member-checking interview was to learn about each participant's views on the role discourses may play in students' engagement with their SJM curriculum. I also wanted to learn about whether and/or how the content of the report I had sent each participant impacted their thinking about their ongoing SJM curriculum development. I audio-recorded all member-checking interviews, made brief notes about the major points they made during the interviews, and made more detailed notes when I re-listened to the audio-recordings. I conducted the member-checking interview with Anthony and David at their respective workplaces and I conducted Flannery's member-checking interview through a Skype call. The duration of the member-checking interviews ranged from approximately 53 minutes to 92 minutes. See Appendix A for the type of questions posed during each member-checking interview.

**The SJM Texts**

Before I describe the SJM texts, I will specify how I conceptually distinguish between *curriculum program* and *curriculum* in this writing. I use the term *curriculum program* to refer

to the required territory-wide, province-wide, or state-wide educational objectives and expectations for student learning within each subject area, and at each grade level, of compulsory schooling in Canada and the U.S. I use the term *curriculum* to refer to any teaching plan and/or material that supports or relates to student learning within each subject area of a specific grade level, and which supports the curriculum program of the territory, province, or state in which students learn in Canada and the U.S. In relation to these definitions, a single-day or multi-day lesson, a unit of lessons, an inquiry-based project, or any other teaching plan and/or material that supports or relates to student learning within a subject area, for a particular grade level, is considered to be a curriculum, whether or not it is designed by the teacher who uses it.

The curricular data collected from each participant of this study is part of what I refer to as the *social justice mathematics (SJM) text*. Each SJM text consists of: (1) the SJM curriculum developed by the participant that is represented in published or unpublished documents; and (2) the transcript of my introductory interview(s) with each participant. While the focus of my analysis was on the content of each participant's SJM curriculum that was part of their SJM text, I utilized the insights each participant shared with me during the introductory interview(s) to inform various aspects of my analysis of their SJM curriculum. There were three types of SJM curricula that were analyzed: (i) a SJM unit developed by Flannery and taught to her Grade 7 mathematics students in 2011; (ii) a SJM project designed by Anthony for Grade 9 mathematics students; and (iii) a SJM lesson developed by David for his Grade 8 mathematics students.

***Flannery's SJM Text***

Flannery had agreed that I could analyze her published *Rethinking Mathematics* chapter essay (see Denny, 2013) about a three-day unit she had taught her Grade 7 students during the 2010 to 2011 school year. During the unit, Flannery's Grade 7 students had the opportunity to

learn about percent change and use this mathematical tool to understand social injustices and other realities in the world. In her chapter essay, Flannery described different aspects of the unit, including: the kind of mathematical concepts and statistical data that were analyzed and utilized during the unit by her and her students; her students' open-ended and hands-on inquiry-based homework assignments; some details from the class discussions that took place over the three-day unit; and part of the learning that some of her students demonstrated by the end of the unit. Flannery's published writing about her percent change unit, as well as her comments about the unit during our introductory interview, comprised Flannery's SJM text for the study.

***Anthony's SJM Text***

In response to my invitation to him to design a curriculum that addressed sexism and/or associated gender injustices, Anthony developed a student instruction sheet for a SJM project during the Fall of 2014. Anthony's SJM curriculum is an open-ended, inquiry-based project focused on gender equity. He developed the project using the curricular and pedagogical insights he gained from teaching high school math curricula within a SJM framework. Anthony's SJM text in this study consists of: (1) the student instruction sheet for his SJM project; and (2) the transcripts of our two introductory interviews. Anthony thought that his SJM project could be taught within the Ontario mathematics program in Canada within the following learning contexts: the Grade 9 applied mathematics course that is more formally known as *Foundations of Mathematics, Grade 9, Applied*; any Grades 9 to 12 vocational oriented math courses; and possibly a middle school mathematics class. Of these different learning contexts, Anthony stated that the Grade 9 applied math course would be the most appropriate context.

### *David's SJM Text*

During our two introductory interviews in the Fall of 2014, David spoke about two SJM lessons that he was developing to teach his Grade 8 mathematics students for the 2014 to 2015 school year. For this study, I chose to focus on one of those lessons which was entitled *Missing*. The title of this lesson relates to its central topic: the reality of missing and murdered Indigenous women and girls in Canada. David published a revised version of *Missing* as one of the SJM curricula he describes in his 2017 follow-up teacher resource book, *Maththatmatters 2*. David's SJM text consists of: (1) the 2014 student activity sheets for *Missing*; (2) his 2014 lesson plan for *Missing*; and (3) the transcripts of both introductory interviews.

## Analytical Framework and Method

### Understanding Feminist Critical Discourse Analysis

As I indicated in Chapter 1 of this writing, I applied the principles of feminist critical discourse analysis that are advocated by Michelle Lazar (2005) when I sought to answer the central research question of this study. To explain how I utilized feminist critical discourse analysis as a methodology, I will describe the wider methodological field of critical discourse analysis in this section. Firstly, I will share a few of James Gee's (2011) views regarding the distinction between discourse analysis and critical discourse analysis. I will then discuss Ruth Wodak's and Michael Meyer's (2009) description of critical discourse analysis before elaborating on Lazar's (2005) five principles of feminist critical discourse analysis.

Gee (2011) defines discourse analysis, in general, as "the analysis of language-in-use whether spoken or written" (p. 205). Gee divides discourse analysis into two broad categories: descriptive discourse analysis and critical discourse analysis. If the goal of a discourse analyst, using any number of methods, is to describe how language functions within a particular context,

such as a conversation or a written text, "in order to understand it" (p. 9), then they are engaging in descriptive discourse analysis (Gee, 2011). However, if a discourse analyst is concerned about how language functions *and* seeks to address, in some way, "social or political issues, problems, and controversies in the world" (p. 9) that are represented through language, then they are engaging in critical discourse analysis (Gee, 2011). While making the distinction between critical and descriptive discourse analysis, Gee (2011) emphasizes that, for him, any discourse analysis is actually a critical discourse analysis because "all language is political and all language is part of the way we build and sustain our world, cultures, and institutions" (p. 10).

Wodak and Meyer (2009) make it clear that critical discourse analysis (CDA) should be viewed as a "research programme" (p. 4) or "school" (p. 5), which, from a critical theory perspective, "aims to shed light on the discursive aspects of societal disparities and inequalities" (p. 32). Through their exploration of social phenomena, critical discourse analysts are focused on helping their readers gain critical knowledge about the ways in which various forms of domination are maintained through language so that, as analysts, they can move towards changing themselves and their society for the better (Wodak & Meyer, 2009).

One of the central features of CDA that Wodak and Meyer (2009) point to as a positive attribute is its theoretical and methodological heterogeneity. Such heterogeneity is, at least, partly due to the development and utilization of CDA by scholars working in a range of disciplines including, but not limited to, semiotics, conversation analysis, discourse studies, and sociolinguistics. Moreover, the reality that various researchers have utilized different meanings of elements and concepts central to a CDA study, such as discourse, critique, power, and ideology, is not considered to be a weakness for this research programme, but a strength.

Like Wodak and Meyer (2009), Lazar (2005) considers CDA as a research perspective in which feminist critical discourse analysis (feminist CDA) constitutes a distinct part. In fact, Lazar (2005) notes that feminist theory has positively impacted CDA studies over its history, while various theoretical elements and analytical tools that have been developed within CDA have benefited the work of feminist discourse scholars. Wodak and Meyer also note that feminist CDA may be considered as part of the CDA research programme overall.

One of the characteristics that makes feminist CDA a unique methodological approach in comparison to other approaches to CDA is that its central concern is to help build a more just society by "critiquing discourses which sustain a patriarchal social order: that is, relations of power that systematically privilege men as a social group and disadvantage, exclude and disempower women as a social group" (Lazar, 2005, p. 5). This is one of the overarching methodological goals of feminist CDA. To achieve this goal, Lazar stresses that feminist critical discourse analysts should engage in an examination of how gender ideology and gender power relations are (re)produced, negotiated, and resisted in multimodal representations of discourse—such as written texts, spoken language, visual images, and so on—which are related to people's social practices, social relationships, as well as social and core/personal identities.

**Lazar's Five Principles of Feminist CDA**

To the extent that I could answer the central research question of this study, I sought to ensure that my analysis of the data set was guided by the five principles Lazar (2005) describes as being interrelated and central to any feminist CDA study. Lazar's (2005) five principles are:

(1) engaging in "feminist analytical resistance" (p. 5);

(2) understanding gender as an "ideological structure" (p. 6);

(3) understanding the "complexity of gender and power relations" (p. 9);

(4) understanding the role of discourse in the "(de)construction of gender" (p. 11); and

(5) engaging in "critical reflexivity" (p. 14).

To provide clarity about these five feminist CDA principles, I will explain each one.

***Principle One***

Lazar (2005) points out that patriarchal constructions of gender, and consequently, gendered power relations and social practices, are hegemonic and, thus, not necessarily easy for people to recognize as problematic or in need of changing. From my understanding of Lazar's (2005) description of the first principle of feminist CDA, an analyst is engaging in feminist analytical resistance when they analyze discourses in societies for the purpose of identifying how patriarchy is structurally maintained through "gendered social practices and [power] relations" (p. 6), in order that their analysis might help in the struggle to dismantle patriarchy and support positive societal change. In a later publication about feminist critical discourse analysis, Lazar (2007) refers to feminist analytical resistance as "feminist analytical activism" (p. 145). It should also be noted that through her citation of CDA scholar Tuen van Dijk's work, Lazar (2005) implies that her conceptualization of feminist analytical resistance is an example of van Dijk's (1991) notion of "*analytical resistance*," (para 4, emphasis in original). For van Dijk (1991), analytical resistance is what critical discourse analysts do through their work of "analyzing the mechanisms of the discourses of power that reproduce and legitimate the many forms of inequality" (para 4) because, in doing such work, analysts are supporting "the struggles of resistance and change" (para 4) that are needed to counter oppressive realities in the world.

***Principle Two***

Informed by feminist theory, Lazar (2005) emphasizes the importance of recognizing that: (a) gender is an ideological structure; and (b) the dominant ideological view of gender

continues to be patriarchal gender ideology. This recognition—which is positioned as the second principle of feminist critical discourse analysis—can help analysts understand the ongoing dominance of patriarchal gender ideology amongst people. According to Lazar (2005), "to say that patriarchal gender ideology is structural is to suggest that it is enacted and renewed in a society's institutions and social practices, which mediate between the individual and the social order" (p. 8). This point supports Lazar's (2005; 2007) view that people's ability to understand patriarchal gender ideology as problematic can be a consequence of how normalized and supported it is in their lives, as well as the extent to which they have internalized it.

***Principle Three***

Lazar's (2005) third principle of feminist CDA is that analysts should approach their work with an understanding of the complexity of gender and gendered power relations as they exist within modern societies. With respect to gender, Lazar (2005) encourages analysts to recognize how patriarchal gender ideology has been persistently enacted across time and that forms of sexism which result from this ideology can be subtle and discursively reproduced. Lazar (2005) advocates that analysts who engage in feminist CDA attend to how women are oppressed due to the enactment of patriarchal gender ideology, while being cognizant of the reality that gender and sexism may be different across cultures and time. Lazar (2005) also stresses the need for feminist critical discourse analysts to keep in mind that the consequences of patriarchal gender ideology may be experienced and discursively (re)produced differently amongst women since gender can interact with "other relations of power based on race/ethnicity, social class, sexual orientation, age, culture and geography" (p. 10) in different ways.

With respect to this principle of feminist CDA, Lazar (2005) emphasizes the importance of recognizing the role of cognition in the discursive (re)production of gendered power relations

between men and women, where power relations are considered as relations that involve struggles over interests. Using insights from other scholars regarding power and hegemony, Lazar (2005) posits that, in modern societies, power within a gendered context is "mostly cognitive, based on an internalization of gendered norms and acted out routinely in texts and talk of everyday life" (p. 10). In response to this reality, Lazar (2005) argues that because the cognitive nature of power within patriarchal gender relations makes it "invisible," (p. 10) and thus hegemonic, feminist critical discourse analysts should address how patriarchal "power and dominance are discursively produced and/or resisted in a variety of ways through textual representations of gendered social practices, and through interactional strategies of talk" (p. 10).

***Principle Four***

Drawing from the insights raised by CDA scholar Norman Fairclough in some of his late 20th century writings about discourse, Lazar (2005) indicates that feminist CDA should explore and highlight how gender realities in our social world are discursively enacted or represented. This is what I understand to be Lazar's (2005) fourth principle of feminist CDA—that is, understanding the role of discourse in the (de)construction of gender within a study of oppressive gender realities in human societies. Lazar (2005) states that feminist critical discourse analysts should attend to "how gender ideology and gendered relations of power are (re)produced, negotiated and contested in representations of social practices, in social relationships between people, and in people's social and personal identities in texts and talk" (p. 11).

Based on Fairclough's theoretical description of the social in discursive terms, Lazar (2005) notes that three "domains" (p. 11)—that is, identities, social relationships, and representations of social practices—are what discursively constitute the social aspects of gender and other social realities. Drawing from feminist theory, Lazar (2005) notes that when analysts

consider these three domains of gender realities, they should keep in mind how "gender relationality" (p. 11) contributes to those domains. By this, Lazar (2005) means that analysts should pay attention to: (a) "the discursive *co-constructions* of ways of doing and being a woman and a man in particular communities of practice" (p. 12, emphasis in original); and (b) how patriarchal masculinity contributes to the oppression of women, with a sensitivity to the reality that both women and men who have internalized aspects of patriarchy may contribute, unconsciously or consciously, to the oppression of women.

***Principle Five***

In order to engage in critical reflexivity, which is the fifth principle of feminist CDA, Lazar (2005) suggests that analysts do two things. Firstly, Lazar (2005) notes that analysts should be aware of how "feminist values" (p. 14) are co-opted by various entities for non-feminist goals. Secondly, Lazar (2005) stresses that feminist critical discourse analysts nurture "critical self-reflexivity" (p. 14): that is, analysts should seek to be critically reflexive about their own "theoretical positions and practices" (p. 15) in order to support, instead of unintentionally undermining, the goal of helping to create a "radical social transformation based on social justice that opens up unlimited possibilities both for women and men as human beings" (p. 16). To this end, Lazar (2005) emphasizes that it is important for analysts to consider implications of social differences amongst women in order to be able to "identify and theorize more accurately the commonalities of gender oppression, and build alliances among women in tackling specific issues and achieving concrete political goals" (p. 17).

**Data Analysis of the SJM Texts**

Although my feminist CDA of each of the SJM texts was guided by principles advocated by Lazar (2005), my data analysis of each of these texts was operationalized through several

aspects of Gee's (2011) method for conducting a discourse analysis. I refer to the method I constructed and used as an *analytical method*. This analytical method was constructed in response to the data I had collected in a way that would enable me to address and answer the central research question of this study. My choice to adapt Gee's (2011) method of discourse analysis, as well as to apply Lazar's (2005) guiding principles for conducting a feminist CDA, in order to best address my research question, is in keeping with the heterogeneous nature of critical discourse analysis as a methodology, which CDA scholars Ruth Wodak and Michael Meyer (2009) consider to be a strength. Before describing my analytical method below, I will discuss part of the theoretical basis for Gee's (2011) method for conducting a discourse analysis.

**Key Tenets of Gee's Method for Discourse Analysis**

Gee's (2011) method for any discourse analysis involves examining a written or spoken piece of language (i.e., a text) by reflecting on and answering specific questions that address what he calls the seven building tasks of language. Gee's (2011) theory of language centers around the notion that "*language has meaning only in and through social practices*" (p. 12, emphasis in original). Related to this conception is the idea that we can make meaning by using language to say or articulate things which, in turn, enables us to participate in social practices and enact certain identities. In short, Gee asserts that we, as human beings, can use grammatical parts of language to build or ascribe meaning to certain aspects of realities in the world. Gee posits that when we communicate through speaking or writing, or engage in listening or reading, we use the grammatical parts of language to build one or more of seven building tasks of language: (1) significance; (2) practices/activities/social practices; (3) identities, by which he means people's socially situated identities as opposed to their core identities; (4) relationships;

(5) politics; 6) connections; and 7) sign systems and knowledge (or sign systems and ways of knowing). Descriptions of these seven building tasks of language are given in Table 3.1.

Table 3.1

*James Gee's Seven Building Tasks of Language*

| **Building Task of Language** | **Description** |
|---|---|
| 1) Significance | The significance task of language refers to the use of language to make things more, or less, important. |
| 2) Practices | When using language to engage in a practice/activity/social practice, people are seeking to engage in a "socially recognized and institutionally or culturally supported endeavor that usually involves sequencing or combining actions in certain specified ways" (p. 210). |
| 3) Identities | When using language in relation to identities, people are "using language to enact specific socially situated identities or to project such identities unto others, or to privilege or disprivilege such identities" (p. 207). |
| 4) Relationships | When people use language in relation to their social relationships, they are using language to begin, maintain, or end those relationships. |
| 5) Politics | Gee (2011) defines social goods as "anything some people in a society want or value" (p. 5) such as "money, status, power, and acceptance" (p. 7). Relatedly, Gee (2011) defines politics as "any situation where social goods or the distribution of social goods are at stake" (p. 210). Using language to engage in politics is one building task of language. |
| 6) Connections | When using language to make connections between things, people are "using language to make things connected or relevant to each other or to make them disconnected or irrelevant to each other" (p. 203). |
| 7) Sign Systems and Ways of Knowing (that is, Sign Systems and Knowledge) | The sign systems and ways of knowing (or sign systems and knowledge) task refers to "using language to create, sustain, revise, change, privilege or disprivilege any language or sign system or characteristic way of knowing the world or making knowledge claims about the world" (p. 211). |

*Note.* The descriptions in this table are based on content found in the book entitled, *An Introduction to Discourse Analysis: Theory and Method,* by J.P. Gee, 2011, pp. 5, 7, 17–19, 203, 207, 210–211. Copyright 2011 by Routledge.

In Gee's (2011) method of discourse analysis, researchers are also encouraged to address the seven building tasks of language by considering six possible "tools of inquiry" (p. 28) that can serve to help them understand what a text is doing, enacting, representing, contesting,

resisting and/or transforming. The tools of inquiry that Gee (2011) discusses in detail throughout his book are: (i) Big "D" Discourses; (ii) social languages (particular styles of language, such as speaking in the vernacular); (iii) Big "C" Conversations (social debates that reflect ideas connected to Discourses); (iv) intertextuality (cross-referencing different spoken or written texts); (v) situated meanings (the meanings of utterances or words based on the context in which they are used); and (vi) figured worlds (typical stories, mental models, or theories that people use, oftentimes unconsciously, to think about and act within the world).

In order to conduct a critical discourse analysis of texts, Gee (2011) advises that analysts compose specific questions that address "how language, at a given time and place, is being used to engage the seven building tasks [of language]" (p. 121). Gee also suggests that analysts incorporate the six tools of inquiry in order to accomplish this. While an ideal discourse analysis would address questions about all seven building tasks of language and all six tools of inquiry, Gee (2011) notes that in a real discourse analysis of particular texts or data only some building tasks of language and tools of inquiry may be needed. This is understandable since the nature and content of a text under study, and the associated research study questions, may not warrant the utilization of all the tools of inquiry or require addressing all building tasks of language.

## Data Analysis Stages and the Analytical Method of This Study

My analysis of the SJM curricula occurred over the course of three major stages. It was during the first stage that I constructed my analytical method in response to the SJM curricula under study. The focus of each of the three stages is captured by the title I have assigned to each.

### *Stage 1 – Constructing the Analytical Method*

I reviewed the curricular data in order to construct an analytical method I could use to conduct a feminist CDA of the SJM texts in a way that would enable me to effectively answer

the central research question of this study. Thus, after transcribing the introductory interviews with all three participants, I did an initial close reading of all SJM curricular documents, and I recorded my initial observations in writing about each one. Based on the initial close reading of the SJM curricula, as well as the observations I made about them, I planned and implemented an analytical method that could enable me to conduct an insightful and methodologically sound feminist CDA of the data set. The seven-step analytical method I constructed and implemented is summarized in Table 3.2. Steps 1 and 2 comprise all the steps of Stage 1, which resulted in the formulation of the analytical categories and questions that guided my feminist CDA of each SJM curriculum. Based on the observations from my initial close reading of the SJM curricula, I found that I needed to address four of Gee's (2011) seven building tasks of language during my analysis, namely: significance; politics; connections; and sign systems and knowledge. After my initial close reading of the SJM curricula, I realized that I only needed to use discourse as a tool of inquiry. While the SJM curriculum of each participant was the focus of the analysis I conducted using discourse as the main tool of inquiry, the insights gained from each participant through their introductory interview(s) about their SJM curriculum, sociopolitical views, and other topics, helped me to better understand the results of my analysis of each SJM curriculum.

Keeping my central research question in mind, I formulated three analytical categories and at least one analytical question for each category. The analytical categories and the building tasks of language on which they are based are: (1) Purpose of the SJM Curriculum; (addressing the building task of significance); (2) Politics and Relevant Knowledge Source(s) of the SJM Curriculum (addressing the building task of politics and the building task of sign systems and knowledge); and (3) Considering the SJM Curriculum in Light of Sexist and Other Discourses

(addressing the building task of connections). The analytical categories, and the analytical question(s) for each analytical category, are given in Table 3.3.

Table 3.2

*Steps 1 to 7 of the Analytical Method Used in This Study*

| **Stages and Steps** | **Task** |
|---|---|
| **Stage 1** | |
| Step 1 | After conducting an initial close reading of all the SJM curricula, identify categories (that is, ***analytical categories***) that reflect the different building tasks of language most relevant to consider when closely analyzing each SJM curriculum. |
| Step 2 | Formulate one or more questions (that is, ***analytical questions***) for each analytical category that could effectively guide my analysis of all three SJM curricula. |
| **Stage 2** | |
| Step 3 | Identify the ***key analytical segments*** of each SJM text—that is, key sections of each participant's curriculum-based document(s), as well as key excerpts of the transcript(s) of their introductory interview(s)—which will enable me to answer the analytical questions, as well as the central research question of the study. |
| Step 4 | Identify the dominant discourses that could be relevant to each SJM curriculum. |
| **Stage 3** | |
| Step 5 | For each SJM curriculum, respond to all analytical questions in writing, allowing insightful information and knowledge related to relevant issues, realities, and discourses to inform my responses to the analytical questions. |
| Step 6 | If needed, conduct one or more literature reviews about gender and other oppressive realities, as well as relevant discourses, that can strengthen the quality of my initial responses to the analytical questions that emerged during Step 5. The final answers I write by the end of Step 6 to the analytical questions will constitute the ***findings*** of my analysis of each SJM curriculum associated with each SJM text. |
| Step 7 | Interpret and discuss the findings of my analysis of each SJM curriculum with respect to the central research question of the study. Also identify the major aspects of the findings that are common across all three SJM curricula. |

Table 3.3

*Analytical Categories and Analytical Questions That Guided the CDA of the SJM Curricula*

| Analytical Category | Analytical Question(s) |
|---|---|
| | |
| Purpose of the SJM Curriculum | Analytical Question 1:<br>What is the purpose (or significance) of the participant's SJM curriculum for middle school or high school math learners? |
| Politics and Relevant Knowledge Source(s) of the SJM Curriculum | Analytical Question 2:<br>What are the major social goods that are directly/explicitly and/or indirectly/implicitly represented in the participant's SJM curriculum (that is, what social ideals, types of social change, educational goals, etc., are represented as good or valuable in the participant's SJM curriculum)?<br><br>Analytical Question 3:<br>How are mathematics and other forms of knowledge positioned as interpretive tools through which students might better understand oppressive sociopolitical realities, including gender and other social injustices, that are informed by the purpose and/or social goods of the participant's SJM curriculum? |
| Considering the SJM Curriculum in Light of Sexist and Other Discourses | Analytical Question 4:<br>How might aspects and/or effects of sexist and other relevant discourses undermine the consciousness-raising potential of the participant's SJM curriculum with respect to providing students with the opportunity to better understand the: (i) influence of sexism in human lives; and (ii) connections between sexism and oppressive gender realities, like gender injustices, that are or should be particularly relevant to the participant's SJM curriculum? |

### *Stage 2 – Identifying Key Analytical Segments*

During Stage 2, I identified key analytical segments of each SJM text, thereby completing Step 3 of my analytical method. For each participant, I did a second close reading of their curricular document(s) and organized the segments in tabular form, grouping the segments according to the topics or issues to which they related. I wrote additional observations (in point form) about each participant's curriculum as well. I then did a close reading of the transcript(s) of each participant's introductory interview(s) and highlighted broad sections that were interesting. I made notes about possible connections between a particular section of a given

transcript and the key analytical segments of each participant's SJM curriculum that I had previously identified. I conducted a second close reading of the highlighted sections of the transcripts and chose the most relevant excerpts (i.e., key excerpts) from amongst them; these became the key analytical segments of the transcript data for each participant. As with the curricular data, I organized the key analytical segments of the transcript data in tables, ensuring that: the key excerpts in each table were relevant topics or issues which a participant had discussed in relation to their SJM curriculum; and the key excerpts had the potential to be insightful sources of information for answering my analytical questions during Step 5.

Data tables with key analytical segments of each participant's SJM curriculum can be found in the first Findings and Discussion chapter associated with each participant's SJM curriculum (that is, Chapters 4, 6, and 8). Data tables with key analytical segments of the transcript data associated with Flannery's, Anthony's and David's introductory interview(s) can be found in Appendix B, Appendix C, and Appendix D, respectively. When quoting key analytical segments in all the Findings and Discussion chapters, I will refer to the title of the tables in which the key analytic segments are written. See Table 3.4 for a list of all data tables.

After I reviewed the key analytical segments of the two data types that comprise the SJM text of each participant, I completed Step 4 of the analytical method. During Step 4, I identified and wrote about dominant discourses that were relevant to each participant's SJM curriculum in terms of how those discourses might help to (re)produce or maintain sexism and other social injustices in society. I also wrote about how these discourses were, or were not, implicitly or explicitly addressed in each SJM curriculum. I then sought to identify the dominant discourses that might obscure students' understanding of gender and other oppressive social realities through their engagement with the SJM curricula under study. When needed, I did some

additional research relating to how certain oppressive discourses impact people's everyday lives and social realities. While I noted my initial observations about relevant dominant discourses during Step 3, I gained more clarity throughout Step 4 about which discourses would be most relevant to my analysis of each SJM curriculum during Step 5.

Table 3.4

*Titles of Tables Containing Key Analytical Segments of the SJM Texts*

| **Table Number** | **Title of Table Containing Key Analytical Segments of a Participant's SJM Text** | **Chapter/Appendix** |
|---|---|---|
| | | |
| Table 4.1 | Flannery's SJM Unit-Text 1 | Chapter 4 |
| Table 4.2 | Flannery's SJM Unit-Text 2 | Chapter 4 |
| Table 4.3 | Flannery's SJM Unit-Text 3 | Chapter 4 |
| Table 4.4 | Flannery's SJM Unit-Text 4 | Chapter 4 |
| Table 4.5 | Flannery's SJM Unit-Text 5 | Chapter 4 |
| Table 4.6 | Flannery's SJM Unit-Text 6 | Chapter 4 |
| Table B1 | Flannery's Interview-Text 1 | Appendix B |
| Table B2 | Flannery's Interview-Text 2 | Appendix B |
| Table B3 | Flannery's Interview-Text 3 | Appendix B |
| Table B4 | Flannery's Interview-Text 4 | Appendix B |
| Table 6.1 | Anthony's SJM Project-Main Text | Chapter 6 |
| Table C1 | Anthony's Second Interview-Text 1 | Appendix C |
| Table C2 | Anthony's Second Interview-Text 2 | Appendix C |
| Table C3 | Anthony's Second Interview-Text 3 | Appendix C |
| Table C4 | Anthony's Second Interview-Text 4 | Appendix C |
| Table C5 | Anthony's Second Interview-Text 5 | Appendix C |
| Table 8.1 | David's SJM Lesson-Text 1 | Chapter 8 |
| Table 8.2 | David's SJM Lesson-Text 2 | Chapter 8 |
| Table 8.3 | David's SJM Lesson-Text 3 | Chapter 8 |
| Table 8.4 | David's SJM Lesson-Text 4 | Chapter 8 |
| Table D1 | David's First Interview-Text 1 | Appendix D |
| Table D2 | David's First Interview-Text 2 | Appendix D |
| Table D3 | David's Second Interview-Text 1 | Appendix D |
| Table D4 | David's Second Interview-Text 2 | Appendix D |
| Table D5 | David's Second Interview-Text 3 | Appendix D |
| Table D6 | David's Second Interview-Text 4 | Appendix D |

### *Stage 3 – Producing and Interpreting the Findings*

During Stage 3, I completed the tasks associated with Steps 5 to 7 for each SJM text individually. During Step 5, I was able to: (A) perform fine-grained analysis of each SJM

curriculum by answering the four analytical questions, which was informed by my understanding of relevant issues, realities, and discourses; and (B) ensure that my answers to the analytical questions were reliable and meaningful by allowing insights from the key analytical segments of a participant's introductory interview(s) to partly inform my analysis of their SJM curriculum.

For each SJM curriculum, I found that I needed to extend my initial response to Analytical Question 4. During Step 6, I was able to extend my initial response to the fourth analytical question after completing literature reviews about gender realities and issues relevant to each SJM curriculum, which helped me to elaborate on, and make better sense of, my initial answer to Analytical Question 4 in relation to each SJM curriculum. The knowledge I gained from additional literature also helped to broaden my understanding of the ways in which sexist and other discourses function to reproduce gender and other oppressive realities that were specifically relevant to each SJM curriculum, as well as how those discourses might obscure young and older people's understanding of such realities. The texts I included in my literature reviews were mainly: analytical and empirical research articles published in peer-reviewed journals; research reports produced by criminal justice, social justice, and human rights organizations, as well as government agencies; and articles from news media sources.

The final answers to the analytical questions that I had written by the end of Step 6 constituted the findings of my data analysis of each SJM curriculum associated with each SJM text. During Step 7, I discussed my interpretations of the findings based on the analysis of each SJM curriculum with respect to the central research question of the study. The findings related to Flannery's SJM unit are discussed in Chapters 4 and 5, the findings related to Anthony's SJM project are discussed in Chapters 6 and 7, and the findings related to David's SJM lesson are discussed in Chapters 8 and 9. My answer to the central research question associated with

Flannery's SJM unit, Anthony's SJM project, and David's SJM lesson, is shared at the end of Chapters 5, 7, and 9, respectively. By the end of Step 7, I was also able to identify common aspects of the findings across the three SJM curricula, and these commonalities informed my overall answer to the central research question of this study (see Chapter 10).

## Ensuring the Quality of the Findings

Sharan Merriam (2002) gives an insightful overview of the multiple measures and strategies that can be used by qualitative researchers to strengthen the quality of their research studies, including poststructural, postmodern, and critical research studies. One important aspect of the quality of any qualitative research study is the trustworthiness of its findings. Based on the nature and specific focus of my study's central research question, I sought to ensure that the quality of my findings could be as trustworthy as possible through two strategies. Firstly, I sought to answer the question, "how congruent are one's findings to reality?" (Merriam, 2002, p. 25). I primarily did this by seeking to ensure that my understanding of oppressive gender realities was informed by credible and reliable: research-based evidence; other information that included, but was not limited to, news reports about relevant issues and history-making events; and theoretical knowledge. This goal was met through the literature reviews I had conducted before and during my analysis of the data set. Referring to credible and reliable research-based evidence, other information, and theoretical knowledge, was particularly important during my response to Analytical Question 4 for each SJM curriculum. Secondly, I sought to strengthen the quality of my findings by conducting member-checking interviews with all the participants of the study, which I have described earlier in this chapter. Merriam indicates that conducting member checks is a common way for qualitative researchers to determine how accurately they have represented and interpreted the data their participants have provided to them in their studies.

# CHAPTER 4

# FLANNERY'S SJM UNIT

# FINDINGS AND DISCUSSION (PART 1)

## The Purpose of Flannery's SJM Unit

- Analytical Question 1: What is the purpose (or significance) of the participant's SJM curriculum for middle school or high school math learners?

When answering Analytical Question 1, I identified four aspects of the purpose of Flannery's three-day SJM unit, which she had taught to her Grade 7 mathematics students in 2011. Flannery's SJM unit provided her Grade 7 math students with the opportunity to learn about percent change and use it, as an interpretive tool, to recognize and understand certain social injustices that have existed within American electoral politics, as well as other realities in the world that were of interest to them. The four aspects of the purpose of Flannery's SJM unit are based on: the statistical data she had provided to her students during the first day of her SJM unit on percent change (see Flannery's SJM Unit-Text 1 in Table 4.1); a data table that represents her students' mathematical work during that first lesson (see Flannery's SJM Unit-Text 2 in Table 4.2); and her description of her motivations for, and the educational goals of, the SJM unit she had developed (see Flannery's SJM Unit-Text 3 in Table 4.3 and Flannery's Interview-Text 1 in Table B1). The four aspects of the SJM unit's purpose are listed here.

- Aspect 1: Using the mathematical concept of percent change as an interpretive tool, students have the opportunity to develop a critical consciousness about the lack of diversity amongst elected members of the United States House of Representatives and the

United States Senate between 1977 and 2011, as well as whether and how oppressive sociopolitical factors contribute to the (re)production of this electoral reality.

- Aspect 2: During their engagement with Flannery's SJM unit, students are given the opportunity to recognize the strengths and limitations of using percent change as an interpretive tool in order to recognize, and understand, realities in the world including, but not limited to, social injustices present within American electoral politics.
- Aspect 3: Through independent inquiry towards the end of Flannery's SJM unit, students have the opportunity to use the mathematical concept of percent change in order to answer their own questions about realities in the world that interest them including, but not limited to, realities they perceive to be social injustices and environmental injustices.
- Aspect 4: Flannery's SJM unit provides students with opportunities to learn cooperatively with their classmates during in-class tasks and discussions, as well as from their classmates' presentations about the results of their independent inquiries that involved the utilization of percent change as a mathematical concept and interpretive tool.

## Politics and Relevant Knowledge Source(s) of Flannery's SJM Unit

### Social Goods of Flannery's SJM Unit

❖ Analytical Question 2: What are the major social goods that are directly/explicitly and/or indirectly/implicitly represented in the participant's SJM curriculum (that is, what social ideals, types of social change, educational goals, etc., are represented as good or valuable in the participant's SJM curriculum)?

Guided by Analytical Question 2, and situated within a revolutionary feminist framework, I identified three major social goods of Flannery's SJM unit on percent change based on the key analytical segments of her SJM text. These three social goods are listed below.

- Social Good 1: Flannery's SJM unit provides students with consciousness-raising learning opportunities to critically analyze the extent to which both chambers of the United States Congress are representative of the diverse population of the country using mathematical concepts and ways of thinking as one set of interpretive tools, as well as to identify, question, analyze, and discuss how oppressive sociopolitical factors might contribute to representational inequalities in American federal electoral politics.
- Social Good 2: During their engagement with Flannery's SJM unit, students are presented with the opportunity to recognize that gender equality should exist within electoral governmental systems, such as the United States Congress.
- Social Good 3: Through small group and class-wide tasks and discussions, and potentially through their own independent inquiries, students have opportunities to recognize the extent to which the mathematical concept of percent change can help to reveal, clarify and/or obscure social injustices, including gender injustices, in the world.

Social Good 1 and Social Good 2 relate to Aspect 1, Aspect 2, and Aspect 4 of the purpose of Flannery's SJM unit, while Social Good 3 relates to Aspect 1, Aspect 2, Aspect 3, and Aspect 4.

***Social Good 1***

The first social good of Flannery's SJM unit on percent change—that is, the ideal that the membership of both chambers of the United States Congress should be representative of the diverse population of America—is considered along the lines of various social categories of difference including, but not limited to, ancestry/'race,' and sex and gender. In the opening activity of her three-day unit with her Grade 7 mathematics class during the Spring semester of the 2010 to 2011 school year, Flannery invited students to analyze and discuss their thoughts about the statistics she had summarized in a handout for them. In her chapter essay, Flannery

had entitled this sheet "STUDENT HANDOUT DATA," which is shown in Flannery's SJM Unit-Text 1 in Table 4.1. From this data source, students were able to review the number of elected Members of Congress who were in the minority in both legislative bodies during each of the two-year terms of the 95th Congress, the 105th Congress, and the 111th Congress.

Of the specific pieces of evidence that demonstrate Social Good 1, two noteworthy ones are from her published essay: her description of part of her motivation for choosing to address the issue of the lack of diversity amongst elected Members of Congress over the course of her lifetime; and her discussion of her students' engagement with, and responses to, the unit. With respect to the first piece of evidence, Flannery reflected on some of the factors that motivated her to develop and teach her SJM unit on percent change in her published chapter essay, stating:

> It was October 2010 and I had read that the representatives in the U.S. Congress were the most diverse that they had been in our nation's history and decided to see how dramatic the change had been over the course of my life-time. I started with the 1979 Senate. How was it possible that nearly 60 years after women won the right to vote, only 3 percent of our senators were women? And only one an African American? I want my students to believe that statistics can tell powerful stories about the injustices in our society, and these numbers seemed like a good place to start. (Flannery's SJM Unit-Text 3)

During the first day's activity, Flannery provided her Grade 7 math students with the opportunity to think about, question, and discuss the data represented in the "STUDENT HANDOUT DATA." By doing so, Flannery enabled her seventh graders to come to know and understand that "statistics can tell powerful stories about the injustices" in American society. Thus, the activity is one example of how Flannery converted her motivations to develop her SJM unit to pedagogical intentionality that could potentially allow her students to experience Social Good 1.

Table 4.1

*Flannery's SJM Unit-Text 1*

Context: The content below is the content of a handout that Flannery had made and distributed to her Grade 7 math students during her introduction of the first lesson of her three-day SJM unit about percent change. Flannery entitled the handout "STUDENT HANDOUT DATA" in her published chapter essay.

**95TH CONGRESS (1977-1979)**

**Senate (100 members)**: 3 women, 1 African American

**House of Representatives (435 members)**: 18 women, 17 African Americans

**105TH CONGRESS (1997-1999)**

**Senate (100 members):** 9 women, 1 African American

**House of Representatives (435 members)**: 57 women, 41 African Americans

**111TH CONGRESS (2009-2011)**

**Senate (100 members)**: 17 women, 1 African American

- 1 Hispanic, 3 Asian Americans, 1 Native American
- 13 Jews, 26 Catholics, 53 Protestant[s], 5 Mormons, 1 Eastern Orthodox Christian

**House of Representatives (435 members)**: 78 women, 42 African Americans

- 25 Hispanic, 8 Asian American[s], 1 Native American
- 32 Jews, 161 Catholic[s], 239 Protestant[s], 2 Muslims, 2 Buddhists, 1 Quaker, 1 Atheist, 5 Mormons
- 3 Openly Gay

*Note*. Bolded, underlined, and bulleted text in this table is bolded, underlined, and bulleted in the corresponding table in Flannery's published chapter essay; see "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), p. 155.

Table 4.2

*Flannery's SJM Unit-Text 2*

Context: The following chart is a replication of Flannery's "PERCENT CHANGE IN CONGRESS" chart, which represents: (a) the categories Flannery wrote on a chart she had displayed on a board in her classroom for her Grade 7 students; and (b) the results of her students' percent change calculations.

| | |
|---|---|
| **Women in the Senate**<br>Change from the 95th to 111th Congress<br>$3 \rightarrow 17$<br>467 percent increase | **Women in the House**<br>Change from the 95th to 111th Congress<br>$18 \rightarrow 78$<br>333 percent increase |
| **African Americans in the Senate**<br>Change from the 95th to 111th Congress<br>$1 \rightarrow 1$<br>0 percent increase | **African Americans in the House**<br>Change from the 95th to 111th Congress<br>$17 \rightarrow 42$<br>147 percent increase |
| **Women in the Senate**<br>Change from the 95th to 111th Congress<br>$3 \rightarrow 17$<br>467 percent increase | **Men in the Senate**<br>Change from the 95th to 111th Congress<br>$97 \rightarrow 83$<br>14 percent decrease |
| **Women in the Senate**<br>Change from the 95th to 105th Congress<br>$3 \rightarrow 9$<br>200 percent increase | **Women in the Senate**<br>Change from the 105th to 111th Congress<br>$9 \rightarrow 17$<br>89 percent increase |

*Note.* The "PERCENT CHANGE IN CONGRESS" chart in this table is taken from "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), p. 157.

Table 4.3

*Flannery's SJM Unit-Text 3*

Context: The following is a quote from Flannery's published chapter essay in which she highlights some of her motivations for her SJM unit about percent change, as well as some of her views concerning gender equality in the American congressional political system. In the following quote, Flannery is referencing the data of the handout entitled "STUDENT HANDOUT DATA" (see Table 4.1).

> It was October 2010 and I had read that the representatives in the U.S. Congress were the most diverse that they had been in our nation's history and decided to see how dramatic the change had been over the course of my lifetime. I started with the 1979 Senate. How was it possible that nearly 60 years after women won the right to vote, only 3 percent of our senators were women? And only one an African American? I want my students to believe that statistics can tell powerful stories about the injustices in our society, and these numbers seemed like a good place to start. (pp. 154-155)

*Note.* The content quoted in this table is from Flannery's published chapter essay, "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), pp. 154–155.

Regarding the second piece of evidence that demonstrates the first social good, Flannery indicated in her chapter essay that she wanted her students to question the lack of diversity in the United States Congress, and think about the possible underlying sociopolitical factors that may have contributed to this reality. For example, Flannery described a part of the class discussion during which the lack of diversity related to the ancestry/'race' of Members of Congress was considered. The following key analytical segments from Table 4.4 help to clarify Flannery's intention to support her students' questioning of relevant statistical data, and facilitate their recognition of sociopolitical factors that might account for more representational inequalities with respect to ancestry/'race' in the United States Senate than in the House of Representatives.

[Flannery]: I distributed the data to my students, asking for their observations and reflections. I hoped they would notice that our representatives in Congress do not represent the full diversity of the country, and question the system that is responsible for that divide.

[Flannery]: Each [student's] question was followed by reactions and hypotheses. I jumped in to engage with some [students], but listened and let them try to answer each other's questions first.

[Flannery]: 'Why do you think that African Americans have gained 26 seats in the House of Representatives over the course of my lifetime, but that there is still only one black senator?'

[Student]: 'There are fewer representatives in the Senate.'

[Student]: 'You don't have to get the whole state to agree to vote someone into the House.'

[Flannery]: I reminded my students of the map of New York City's voting district that we look at when we're lobbying our representatives…'What do you think happens outside of cities?' I asked the class. 'Do you think that there are districts where most of the voters are African Americans?'

[Student]: 'Maybe in the South?'

[Flannery]: I used the opportunity to explain that people in power have historically gone out of their way to make it hard for African Americans, Latina/os and other people of color to end up in control of voting districts by creating strangely shaped districts that disperse communities among several districts…The data that we were looking at is a good reason why we have to be thoughtful about how we set up our voting districts.

(Flannery's SJM Unit-Text 4)

As indicated through these key analytical segments, Flannery's description of how she facilitated students' questioning and discussion of the underrepresentation of African Americans in the United States Senate, as well as her questions and points concerning the potential influence of inequitable congressional voting districts as a contributing factor to the problem, demonstrates her intent to support her students' critical consciousness development regarding certain sociopolitical inequalities within American elected politics. Indeed, regarding racial injustices associated with the setup of voting districts, Flannery wanted her students to realize that "people in power have historically gone out of their way to make it hard for African Americans,

Latina/os and other people of color to end up in control of voting districts by creating strangely shaped districts that disperse communities among several districts."

Table 4.4

*Flannery's SJM Unit-Text 4*

Context: The following is a series of statements Flannery wrote in different sections of her published chapter essay. These statements by Flannery describe some of her and her students' responses to the data shown in the "STUDENT HANDOUT DATA" (see Table 4.1). These statements were made at different points of the class discussion about the data represented in Table 4.1, which took place on the first day of the SJM unit. Although it was not done in Flannery's chapter essay, I have indicated when Flannery is writing in the first person by enclosing her name in brackets, and I have indicated when Flannery is describing what a student said during the class discussion by enclosing the word "Student" in brackets.

[Flannery]: "I distributed the data to my students, asking for their observations and reflections. I hoped they would notice that our representatives in Congress do not represent the full diversity of the country, and question the system that is responsible for that divide." [p. 155]

[Flannery]: "Each [student's] question was followed by reactions and hypotheses. I jumped in to engage with some [students], but listened and let them try to answer each other's questions first." [p. 155]

[Flannery]: "I made a point of engaging the students' anger about the sole African American in the U.S. Senate." [p. 156]

[Flannery]: "We agreed that race should not be the only criterion on which people base their votes, but we were clear that there should be more African Americans in Congress." [p. 156]

[Flannery]: "'Why do you think that African Americans have gained 26 seats in the House of Representatives over the course of my lifetime, but that there is still only one black senator?'" [p. 156]

[Student]: "'There are fewer representatives in the Senate.'" [p. 156]

[Student]: "'You don't have to get the whole state to agree to vote someone into the House.'" [p. 156]

[Flannery]: "I reminded my students of the map of New York City's voting district that we look at when we're lobbying our representatives…'What do you think happens outside of cities?' I asked the class. 'Do you think that there are districts where most of the voters are African Americans?'" [p. 156]

[Student]: "'Maybe in the South?'" [p. 156]

[Flannery]: "I used the opportunity to explain that people in power have historically gone out of their way to make it hard for African Americans, Latina/os and other people of color to end up in control of voting districts by creating strangely shaped districts that disperse communities among several districts…The data that we were looking at is a good reason why we have to be thoughtful about how we set up our voting districts." [p. 156].

*Note.* The quoted content in this table is from "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), 155–156.

Table 4.5

*Flannery's SJM Unit-Text 5*

Context: During the class discussion of the percent change calculations that were completed by her students on the first day of her SJM unit, Flannery noted in her published chapter essay that she and her students "looked at the difference in the percent change experienced by men in the Senate vs. women in the Senate" (Denny, 2013, p. 157). Flannery then describes some of the questions she posed during that discussion and some of her students' answers. The following statements are from Flannery's description of some of what was said during that class discussion. I have indicated when Flannery is writing in the first person by enclosing her name in brackets, and I have indicated when Flannery is describing what one or more students said by enclosing the words "Student" or "Multiple Students" in brackets.

[Flannery]: "'Why is the same 14 seats turning over from men to women a 467 percent gain for women and only a 14 percent decrease for men?'" [p. 157]

[Student]: "'The men started out with almost all of the seats, and they still have almost all of the seats.'" [p. 157].

[Student]: "'Women still don't have very many seats in the Senate, but they've gained almost five times as many as they started with. That's a big change!'" [p. 157]

[Flannery]: "I pushed a little more: 'Do you think that women feel differently now about their access to power than they did 30 years ago?' [p. 157]

[Multiple Students]: "'Yes!' a chorus shouted." [p. 157]

[Flannery]: "'Do you think [men] feel like they have less power?'" [p. 157]

[Multiple Students]: "'No,' they said, shaking their heads." [p. 157]

[Flannery]: "'What do you think is a better way of talking about the progress that women have made in the Senate?' I asked. 'They've gained 14 seats or their representation has increased by 467 percent?'" [p. 157]

[Student]: "'Four hundred and sixty-seven percent sounds like a lot more change.'" [p. 157]

[Student]: "'Fourteen seats doesn't sound like that much.'" [p. 158]

[Student]: "'I don't know, but women should have a lot more seats than we do.'" [p. 158]

[Student]: "'Maybe it's important to tell both'" [p. 158]

*Note.* The quoted content in this table is from "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), pp. 157–158.

Table 4.6

*Flannery's SJM Unit-Text 6*

Context: After the first day's lesson of her SJM unit, Flannery gave her students an inquiry-based homework assignment that required them to formulate a question about the real world which could be answered using percent change as a mathematical tool. Each student was then given the time to finalize and investigate answers to their question, as well as complete a poster about their question that included the answers they had found, during and after the second class of the unit. On the third and final day of the unit, students presented their posters to their classmates. The first quote below is part of Flannery's descriptions about the two-day, open-ended, inquiry-based assignment. The second quote given below is Flannery's view about her SJM unit on percent change in relation to the overall SJM curricula she teaches, and with respect to the social justice oriented mission of the school at which she teaches.

> For some students this [inquiry-based poster assignment] provided an opportunity to apply their new math skill to something that they were already wondering about. For others, this was a chance to think of a new question. Knowing that they would be spending at least 40 minutes of [the second day's] class time engaging with their questions and that their work was destined for display pushed my students to be creative and to take the process of developing an interesting question seriously…The broad range of students' questions reflected the racial and socioeconomic diversity of the student body as well as their engagement with a broader curriculum focused on social and environmental justice, annual activism projects, and many weeks at the school farm....During the next [that is, third] class period, students took turns presenting their posters to the group. They were as impressed as I was by the range of questions and shocked by many of the findings….For my students, seeing their work on the wall elevated the importance of the skill that we learned. Although we spent only three 45-minute class periods on percent change, my students appreciated the diversity of its applications in the world. (pp. 158–160)

> Although this unit could be a stand-alone, for my students it does not exist in isolation; it is part of a series of ways in which I engage my students in making connections between social justice and math. And I am only one teacher in a community of educators at [my school] whose explicit mission is to create opportunities for our students to wrestle with themes of identity, community, diversity, sustainability, civil rights, activism, and justice. I hope that my students, as citizens of the world working to create positive change, will think of mathematics as one of the tools in their toolbox. (p. 160)

*Note.* The statements made by Flannery that are quoted in this table are taken from "Teaching Percent Change + Social Justice = Opportunity for Deep Mathematical Discussion," by F. Denny, 2013, in E. Gutstein & B. Peterson (Eds.), *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd ed., pp. 154–160), pp. 158–160.

After the introductory activity involving the class discussion of the demographic changes in both legislative bodies of the U.S. federal government, Flannery introduced the mathematical concept of percent change to her class by posing thought-provoking questions about the meaning and purpose of the percent change formula—that is, percent change = [(amount of change) ÷ (original amount)] x 100%. This conceptual conversation was followed by an activity in which

each student completed a percent change calculation based on the initial demographic data they reviewed in the "STUDENT DATA HANDOUT." In order to ensure that all students could make comparisons during a follow-up class discussion about their results, as well as the implications of their results, Flannery recorded their calculations on a large chart. This chart, which Flannery entitled "PERCENT CHANGE IN CONGRESS" in her chapter essay, is replicated in Table 4.2. It shows the percent change calculations the seventh graders generated in relation to the changes amongst African Americans, women, and men, in the U.S. Congress.

***Social Good 2***

Flannery's decision to present students with specific demographic statistics related to the membership of the U.S. Congress in the "STUDENT HANDOUT DATA," as well as her choice to give her Grade 7 math learners the opportunity to complete the aforementioned percent change activity based on that data, are just two examples of learning opportunities that highlight the second social good of her SJM unit: namely, that there should be gender equality within electoral governmental systems in American society. Another aspect of her SJM unit that reflects this social good is found in some of the statements made, as well as the questions posed, by Flannery and her Grade 7 students during the class discussion that followed the percent change activity. Take, for example, the following key analytical segments of Flannery's published chapter essay that relate to the percent change of women and men in the Senate between 1977 and 2011.

[Flannery]: 'Why is the same 14 seats turning over from men to women a 467 percent gain for women and only a 14 percent decrease for men?'

[Student]: 'The men started out with almost all of the seats, and they still have almost all of the seats.'

[Student]: ‘Women still don’t have very many seats in the Senate, but they’ve gained almost five times as many as they started with. That’s a big change!’

[Flannery]: I pushed a little more: ‘Do you think that women feel differently now about their access to power than they did 30 years ago?’

[Multiple Students]: ‘Yes!’ a chorus shouted.

[Flannery]: ‘Do you think [men] feel like they have less power?’

[Multiple Students]: ‘No,’ they said, shaking their heads.

(Flannery’s SJM Unit-Text 5)

The last two questions posed by Flannery here, as well as the responses some students had given, collectively serve as another example of how the social good that gender equality should occur within the American electoral political system was embedded in Flannery’s SJM unit.

***Social Good 3***

The percent change calculation activity and the follow-up class discussion that Flannery’s Grade 7 students engaged in also reflect the third social good of her SJM unit. That is, through these two learning opportunities, students could potentially recognize the extent to which using percent change as an interpretive tool can reveal, clarify, and/or obscure, gender and other social injustices in the world, including in American elected politics. An example of how Social Good 3 could have been experienced by students during the first lesson is represented in the following key analytical segments of Flannery’s published description of the follow-up class discussion.

[Flannery]: ‘What do you think is a better way of talking about the progress that women have made in the Senate?’ I asked. ‘They’ve gained 14 seats or their representation has increased by 467 percent?’

[Student]: ‘Four hundred and sixty-seven percent sounds like a lot more change.’

[Student]: ‘Fourteen seats doesn’t sound like that much.’

[Student]: ‘I don’t know, but women should have a lot more seats than we do.’

[Student]: ‘Maybe it’s important to tell both.’

(Flannery’s SJM Unit-Text 5)

The responses from some of Flannery’s students that are indicated in the above key analytical segments from Flannery’s SJM Unit-Text 5 suggest that (at least some of) her seventh graders experienced Social Good 3. In response to Flannery’s question, “What do you think is a better way of talking about the progress that women have made in the Senate?...They’ve gained 14 seats or their representation has increased by 467 percent?” four students gave thoughtful responses: “Four hundred and sixty-seven percent sounds like a lot more change;” “Fourteen seats doesn’t sound like that much;” “I don’t know, but women should have a lot more seats than we do;” and “Maybe it’s important to tell both.” Together, all four responses speak to the benefit of giving Grade 7 students the opportunity to critically think about, and discuss, the extent to which a mathematical tool like percent change can be used to determine how much progress was made between 1977 and 2011 with respect to gender-based representational equality amongst Members of Congress in the U.S. Senate. These four responses also indicate that students can benefit from considering the importance of using percent change results with other mathematical information to better understand representational gender equality changes in the U.S. Senate, since percent change alone might obscure the reality of this gender justice issue.

In our introductory interview, Flannery spoke about her intention to allow her Grade 7 mathematics students the space to experience Social Good 3 by analyzing the mathematical tool

of percent change itself in the context of understanding gender injustices, such as gender-related representational inequality, during their engagement with her SJM unit. Flannery stated:

> I wanted [my] kids to know how to do the [percent change] calculation...So, a really critical part of the math is that percent change is based on what the starting point is....Like if you were just to say, 'Oh, women started with three seats [in the Senate] and now they have seven,' you know, that's, like, we gained four seats or more than twice as many. [However,] if you look at the percent change, you're, like, 'Ahhh, it's 133% change,' [and] it sounds gigantic, right? It sounds like the whole world has shifted and been overhauled; meanwhile, it's still not very many [out] of a hundred seats. So, I think my anchoring the math learning in context allows [students] to [consider]: what are the limitations of this sort of descriptor, and what are the strengths of it? (Flannery's Interview-Text 1)

As reflected in Social Good 3, Flannery indicated that she wanted her students to understand the "limitations" and "strengths" of percent change as a mathematical tool which, for her, was a consequence of "anchoring the math learning in context." The act of "anchoring the math learning in context" was with respect to Flannery's intent on allowing her students to consider the meaning of the percent change result of 467%, and the mathematical representation of the increase of women Senators (that is, the increase of 14 seats that the percent change represents), in order to help her seventh graders better understand the reality of the change regarding gender-related representational equality within the United States Senate between 1977 and 2011.

Flannery's Grade 7 students may have also been able to experience Social Good 3 through the independent, open-ended, inquiry-based assignment that they were asked to complete during the SJM unit. Through the inquiry-based assignment, Flannery asked her

students to search for and identify answers to a question about the world, using percent change as an interpretive tool. After each student investigated their question, they were to develop a poster about some of the answers to it. According to Flannery, "the posters needed to include their questions, the process of answering their questions, their findings, an image, and the source[s] of their information" (Denny, 2013, p. 158). Flannery gave her students the opportunity to begin formulating and researching their questions for homework after the first lesson of the unit. Flannery also made sure that her students received any needed support from her in the second lesson of the unit, during which they had talked about their initial questions and emerging sets of data with her and their peers. Some students were also ready to begin, or continue, their investigative work and their posters during the second class. Throughout the third and final 45-minute class of the unit, Flannery's Grade 7 students presented their posters to their classmates.

Based on Flannery's summary of the issues that students had explored through the investigations of their respective questions, most of her students applied the concept of percent change to social and environmental issues—from the percent change in the deportation of undocumented immigrants living in the U.S. since 2009, to the percent change in the amount of carbon dioxide in the Earth's atmosphere since the rise of industrialization (see Denny, 2013). The following key analytical segment of Flannery's chapter essay—which is made up of different statements she made over several pages of that text—speaks to a few of the reasons for the diversity of the questions her students explored using percent change as a mathematical tool:

> For some students this [inquiry-based poster assignment] provided an opportunity to apply their new math skill to something that they were already wondering about. For others, this was a chance to think of a new question. Knowing that they would be spending at least 40 minutes of [the second day's] class time engaging with their

> questions and that their work was destined for display pushed my students to be creative and to take the process of developing an interesting question seriously…The broad range of students' questions reflected the racial and socioeconomic diversity of the student body as well as their engagement with a broader curriculum focused on social and environmental justice, annual activism projects, and many weeks at the school farm....During the next [that is, third] class period, students took turns presenting their posters to the group. They were as impressed as I was by the range of questions and shocked by many of the findings….For my students, seeing their work on the wall elevated the importance of the skill that we learned. Although we spent only three 45-minute class periods on percent change, my students appreciated the diversity of its applications in the world. (Flannery's SJM Unit-Text 6)

While the range of topics that her Grade 7 students explored through their inquiries was diverse and not limited to social justice issues, all students could have potentially experienced Social Good 3 either: (a) directly, if they explored a question that addressed social injustice(s); or (b) indirectly, if they did not investigate a social injustice using percent change, but were able to consider the posters made, and presentations given, by classmates who did.

Flannery had clarified to me that she had first taught a slightly different version of her SJM unit on percent change to her Grade 8 math students during the Fall semester of the 2010 to 2011 school year. In her revised curriculum on percent change during the 2011 Spring semester—which was the experience she wrote about in her published chapter essay—Flannery sought to ensure that each of her Grade 7 math students had the opportunity to formulate their own question about the world, using percent change as a mathematical tool in their inquiry. During our introductory interview, Flannery noted that she thought the unit became more

interesting to students when they had the opportunity to pose, and investigate, their own questions after their exploration of the demographic data about Members of Congress during the first day's lesson. Specifically, Flannery explained her reasons for wanting her Grade 7 math students to engage in an independent, open-ended, inquiry-based assignment as follows:

> So, the homework assignment I gave [my Grade 8 students during the Fall of the 2010 to 2011 school year] was to, like, ask a question about the data that I had provided them with and answer it. Some [students] were really curious or angry or emotional about looking at the demographic shifts in the Congress…[Some of the students] weren't actually all that personally curious about it. So, the unit became so much richer [during Spring] when I said [to my Grade 7 students], 'it is now your job to think about what do you want to know in the world?' and for them to go out and ask their own questions. For many of the students that was an environmental or social justice issue…One girl asked, like, 'what [is] the percent change in the number of crayon colors available in Crayola?' Right? Like, that's a great question. She's learning math. She's, like, asking her own question, finding the data. In the end, when there were 20 kids sharing their work, she's getting to hear about all the social and environmental justice investigations that [were done by her classmates] and that's all right....So a big unit goal is [that the students] connect back to their own curiosity [and] recognize the math [they are learning] as a tool for answering their own questions. (Flannery's Interview-Text 1)

**Relevant Knowledge Source(s) of Flannery's SJM Unit**

- Analytical Question 3: How are mathematics and other forms of knowledge positioned as interpretive tools through which students might better understand oppressive

sociopolitical realities, including gender and other social injustices, that are informed by the purpose and/or social goods of the participant's SJM curriculum?

When seeking to answer Analytical Question 3 during my analysis of Flannery's three-day SJM unit on percent change, I considered the unit as consisting of two stages. Stage 1 was comprised of the first day's class investigation that addressed the lack of diversity amongst the elected members of the United States Congress, as well as the application of the mathematical concept of percent change to support students' recognition and understanding of several social injustices that resulted from, and contributed to, the underrepresentation of different demographic groups in the two legislative bodies between 1977 and 2011. Stage 2 was comprised of the in-class tasks and homework tasks that Flannery's Grade 7 students did in order to complete their inquiry-based poster assignments. Depending on which of the two major stages of Flannery's SJM unit is being considered, Grade 7 students would have potentially been able to learn about specific issues they were investigating using at least two types of knowledge from these three types of knowledge: mathematical knowledge, sociopolitical knowledge, and experience-based knowledge. While other types of knowledge may have been used by Flannery's students during the SJM unit, I noted in Chapter 2 of this dissertation that these three types of knowledge are important for students to use and/or (re)produce when they engage with SJM curricula that address social injustices. Such types of knowledge can help students construct the emancipatory knowledge that is needed for developing a critical consciousness.

As indicated in my discussion of Social Goods 1, 2 and 3, Flannery's Grade 7 students needed to use mathematical concepts that included, but were not limited to, percent change, as well as mathematical ways of thinking, during Stage 1 of the unit. My discussion of these three social goods also indicate that Flannery's students were encouraged to utilize sociopolitical

knowledge during Stage 1 of the unit in order to interpret, and make meaning of, the results of their percent change calculations that related to the underrepresentation of some demographic groups elected to the United States Congress, as well as certain sociopolitical factors that might be contributing to representational inequality in the United States Congress. In addition to having opportunities to use mathematical and sociopolitical knowledge during Stage 1 of the unit, Flannery's students had opportunities to build experience-based knowledge indirectly through the insights they gained about the electoral realities related to certain demographic groups of politicians during their review, analysis, and discussion of the statistical data.

During Stage 2 of Flannery's SJM unit, the seventh graders were required to utilize mathematical knowledge, in the form of percent change, in order to seek answers to their respective questions about the world, regardless of the nature of the realities that their questions addressed in the inquiry-based poster assignment. Due to the open-ended nature of this assignment, some of Flannery's Grade 7 students did not necessarily need to utilize sociopolitical knowledge, or experience-based knowledge, to answer their respective questions, if those questions were not about oppressive or non-oppressive sociopolitical realities. Thus, the central learning opportunity during Stage 2 of Flannery's SJM unit may have only involved, for some students, the use of mathematical knowledge amongst the three types of knowledge that were used or (re)produced during the in-class tasks they did in Stage 1 of her SJM unit.

When Stages 1 and 2 of Flannery's SJM unit are considered collectively, it is mathematical knowledge that is positioned as privileged knowledge because the use of percent change, as an interpretive tool, was required of students in both stages. This finding is reflected in my discussion of Social Goods 1, 2 and 3. However, sociopolitical knowledge and experience-based knowledge were positioned as important to student learning during Stages 1

and 2 of the percent change unit in different ways. During Stage 1 of Flannery's unit—which addressed representational inequalities in congressional electoral politics, as well as sociopolitical factors that might contribute to such social injustices—students were encouraged to directly use mathematical knowledge and sociopolitical knowledge, and indirectly use experience-based knowledge due to their use of the two other types of knowledge, in a balanced way, in order to better understand the central issues of Stage 1. During Stage 2, neither sociopolitical knowledge, nor experience-based knowledge, may have been used by some of Flannery's seventh graders to answer their own questions for the inquiry-based poster assignment because their questions did not need to be about social injustices. While the seventh graders' questions could have been about any real-world phenomenon, some of Flannery's students did pose and answer questions that addressed various social injustices for the Stage 2 poster assignment. Thus, when students who did explore questions about social injustices presented their work in class, students whose questions did not involve social injustices would have had the opportunity to utilize sociopolitical knowledge and/or experience-based knowledge in order to understand their peers' questions and findings for the Stage 2 poster assignment.

## Concluding Thoughts

Flannery's SJM unit on percent change began with an investigation of demographic statistics that helped her Grade 7 math students recognize and question the representational inequalities that exist within the U.S. Congress along the lines of ancestry/'race,' sex and gender, and other categories of social difference. During this first stage of the unit, students were able to: examine and discuss demographic data; analyze the data set using the interpretive tool of percent change; and engage in a follow-up class discussion about their percent change calculations related to the data set. During the second stage of the unit, Flannery gave her Grade

7 students the opportunity to apply their knowledge of percent change to a question that interested them, and then share the findings related to their questions with their classmates.

Social Goods 1 to 3 of Flannery's SJM unit, as well as Aspects 1 to 4 of the purpose of her unit, each of which connected with one or more of the three social goods, served to make Flannery's unit a strong SJM curriculum that provided her Grade 7 math students with learning opportunities which could potentially: (a) strengthen their critical consciousness about certain demographically-based representational inequalities within electoral politics, as well as factors that might contribute to those inequalities; and (b) help them to better understand realities that were of interest to them and their classmates, which included, but were not limited to, social and environmental injustices. As the issues presented in Stage 1 of Flannery's SJM unit were related to gender and other social injustices, it can be stated that only in Stage 1 did each student have the opportunity to develop their critical consciousness about such injustices as a result of their own direct engagement with those issues. Consequently, the potential strengthening of Grade 7 students' critical consciousness development about gender and other social injustices addressed in Stage 1 of the SJM unit would likely have been directly supported by mathematical knowledge and sociopolitical knowledge, and indirectly by experience-based knowledge. During Stage 2 of Flannery's SJM unit, each student's critical consciousness development about social injustices that were explored either by them, or by their classmates, for the Stage 2 poster assignment, would have also been supported by mathematical knowledge, as well as sociopolitical and/or experience-based knowledge, prior to or during the presentations.

The findings related to Analytical Questions 1, 2 and 3, which have been discussed in this chapter, and briefly summarized here, collectively formed an important starting point from which I formulated an answer to the central research question of the study regarding Flannery's SJM

unit. In the next chapter, I will contextualize and discuss my response to Analytical Question 4. Informed by the findings associated with Analytical Questions 1 to 4, I will also share my answer to this study's central research question regarding Flannery's SJM unit.

# CHAPTER 5

# FLANNERY'S SJM UNIT

# FINDINGS AND DISCUSSION (PART 2)

## Key Insights Related to Relevant Discourses

The learning activities associated with Stage 1 of Flannery's SJM unit about percent change—in which representational inequalities in the United States Congress along the lines of ancestry/'race,' sex and gender, and other categories of social difference—provided her Grade 7 math students with opportunities to consider several underlying reasons that could account for these types of social injustices. Although the seventh graders were able to directly explore gender and other social injustices during the first stage of Flannery's SJM unit, they were not required to do so for their own inquiry-based work during Stage 2 of the unit. Thus, when responding to Analytical Question 4 during my analysis of Flannery's SJM unit, I only considered the learning activities done during Stage 1. When answering Analytical Question 4, I also found it helpful to consider research-based evidence and analyses about how sexist discourses and, whenever relevant, other discourses of hierarchy, domination, and subordination, might influence elected political realities in American society. I will discuss some of these insights before sharing my response to Analytical Question 4 in relation to Flannery's SJM unit.

### Reasons for Concern Despite Evidence of Progress in Elected Politics

Within democracies like Canada and the United States, voter choice is a very important factor impacting the outcomes of elections. Findings from some research studies about different types of electoral politics held in the United States over the past decade or so provide a justification to be concerned about the impact of sexist discourses on some voters' choices for

elected office nominees of political parties (e.g., Bos, 2011; Paul & Smith, 2008), as well as for candidates running for elected office at different levels of government in general elections (e.g., Bock et al., 2017; Junn, 2017; Schaffner et al., 2018). A review of the findings about voter choice, in both partisan and general elections, from four of these cited studies demonstrates how sexist discourses, and racist discourses in some contexts, can function within U.S. elections.

A study by political scientist and scholar Angela Bos (2011) demonstrates that within individual political parties, gender stereotypes can have an influence on the election of a party's nominee for a state office. For her study, Bos explored whether and how gender stereotypes influenced the delegates who voted for Democratic party nominees running in state elections. The party nominations she examined were for the office of the Board of Equalization in California, attorney general in New York, lieutenant governor in Massachusetts, and governor in Minnesota. Bos also sought to explore whether and how gender stereotypes may be more influential when a party nominee candidate does not control messages about themselves, such as during discussions among party delegates at a convention. Bos (2011) did this by investigating how delegate discussions might "reinforce, activate or reactivate group stereotypes related to gender" (p. 92). Bos' knowledge about the possibility of reactivation of group stereotypes is based partly on the results of the research study conducted by Ziva Kunda, Paul Davies, Barbara Adams, and Steven Spencer (2002), which focused on an analysis of the evolution of racial stereotypes over time amongst their study's participants. To address her research goals, Bos formulated and tested six hypotheses using survey data from over 300 delegate respondents.

Of the four nominee races involving male and female candidates, three males were nominated by delegates to represent the Democratic party in the statewide elections for governor, lieutenant governor, and attorney general. Based on the results of her analysis of delegates'

views about male and female candidates running for their party's nomination for each office, Bos (2011) found that delegates considered male and female candidates in a more balanced way—that is, in the language Bos uses, "as possessing both feminine and masculine traits and as capable to handle political issues" (p. 101)—when they gained information from a candidate through candidate-controlled sources such as direct interactions with a candidate, as well as a candidate's campaign communications. However, Bos' (2011) analysis of the survey data revealed that "delegate discussion negatively relates to viewing the female candidate as capable to handle masculine issues and as possessing masculine traits, and thereafter these perceptions negatively relate to supporting her as the party's nominee" (p. 102). In short, gender stereotypes seemed to have adversely affected female candidates if they were activated through delegate discussions. Bos notes that this result may be partly due to what some other research-based evidence has suggested: that is, certain traits and issue-based competencies which are stereotypically associated with males are more highly valued for executive political office.

The findings of Bos' (2011) study speak to one of the disadvantages that results from our intended or unintended acceptance of the genderization of human qualities: namely, that any person, regardless of their sex, may be subjected to negative judgements and evaluations by others when they express human qualities that do not conform to sexist gender expectations. Indeed, the sexist notion that human qualities are, or should be, gendered can delimit and restrict our ideas of what it means to be a human who is female or male. Sexist discourses can also influence how we judge ourselves and others, as well as the choices and actions that accompany such judgements, including our judgements of, support for, or lack of support for, political candidates based on their sex. In fact, there is research-based analyses and evidence about the 2016 presidential election that relate to such consequences of sexist discourses.

Of the factors that influenced voter choice in the 2016 presidential election in the United States, some researchers found that sexism was one key factor (e.g., Bock et al., 2017; Junn, 2017, Knuckey, 2019; Schaffner et al., 2018). Yet, it must be noted that other factors have been identified as contributing to the outcome of the 2016 presidential election, which saw Hillary Clinton win the popular vote by over 2.8 million ballots, but lose the Electoral College vote for the presidency to Donald Trump. Such factors include: racism and the "racialization of politics" (p. 38) over the previous decade in America (e.g., Sides et al., 2017); and the Russian cyber-interference in American culture and politics before and during the 2016 presidential campaign (e.g., Badawy et al., 2018; Shane, 2018), which has been part of the Russian government's overall strategy to undermine democracies it sees as hostile to its interests (see Richey, 2018).

In order to test their hypothesis that some voters may have been influenced by sexism, and negative attitudes towards women when they voted in the 2016 presidential election, Jarrod Bock, Jennifer Byrd-Craven, and Melissa Burkley (2017) collected data from 239 male and female university students who had voted in the 2016 election through an online survey comprised of several questionnaires. These questionnaires were meant to measure three factors that may have influenced the respondents' voting behaviour: 1) support of sexism, particularly benevolent sexism and hostile sexism; 2) attitudes towards women; and 3) views about women's and men's roles in society, or what Bock et al. (2017) refer to as "gender role attitudes" (p. 190). Respondents were able to complete the survey soon after the 2016 election until February 14, 2017, causing Bock et al. (2017) to believe that their attitudes towards all presidential nominees, including third-party candidates on the ballot of the respondents' southwestern state, "may be more reflective of the true attitudes that potentially affected [their] voting behavior" (p. 192).

Bock et al. (2017) quantitatively analyzed the survey responses from 138 participants who had indicated that they voted for either Hillary Clinton or Donald Trump to test their hypothesis because both candidates represented about 94% of the total vote. The majority of participants in the study indicated that they had voted for Donald Trump, which, according to the researchers, reflected the voting behaviour of the general population of the respondents' state of residence. Based on their data analysis, Bock et al. (2017) found that, as with the respondents who identified themselves as Republicans, those who indicated they had voted for Donald Trump "reported significantly higher levels of benevolent sexism, hostile sexism, traditional [that is, sexist] attitudes towards women, and significantly lower egalitarian sex role attitudes" (p. 191), when compared to those who indicated they had voted for Hillary Clinton. Moreover, Bock et al. (2017) found that while the political party identification of their respondents was the strongest predictor of their voting behaviour, possessing "greater hostile sexism and having traditional [that is, sexist] attitudes towards women served as strong predictors of voting for Trump" (p. 192). The findings of their study are particularly noteworthy because Bock et al. had controlled for the political party affiliation and sex of the participants.

In seeking to explain why hostile sexism, rather than benevolent sexism, functioned as a strong predictor of participants' choice to vote for Trump, Bock et al. (2017) drew on the theory of other scholars to suggest that a "backlash effect" (p. 189) against women with agency, who do not conform to sexist stereotypes of what a woman should do or be like, may have contributed to some respondents' choice to vote for Trump. Bock et al. (2017) discuss how the backlash effect operates in general, and how it might have operated for some participants, as follows:

> While benevolent sexism primarily rewards women's adherence to traditional gender roles (i.e., carrot), hostile sexism concerns negative attitudes toward women who violate

> traditional norms (i.e., stick). Thus, the ability of hostile sexism to predict voting behaviour may represent an underlying disdain for an…agentic woman. (p. 192)

This explanation aligns with revolutionary feminist discourses about sex and gender realities because it acknowledges that instances of gender inequality can be (re)produced partly due to people's acceptance, or internalization, of various aspects of patriarchal/sexist discourses.

That some American men and women have accepted, or internalized, sexist *and* racist discourses may also partly explain why Hillary Clinton garnered the support of about 43% of white women voters, including college-educated white women, but Donald Trump won the support of approximately 52% of white women (Junn, 2017). Seeking to promote an intersectional analysis of elected politics that could explain results such as the majority support for Trump amongst white women, Jane Junn (2017) encourages academic and non-academic analysts to take into consideration that within the "race-gender hierarchy in the U.S." (p. 346), some white women, like some white men, may be influenced by an internalization or acceptance of patriarchy/sexism and white supremacy. Junn (2017) partly bases her encouragement of this type of political analysis on the statistical data provided by the American National Election Study. The study had revealed that the majority of white women who have voted in presidential elections between 1952 and 2012 have voted for the white, male Republican nominee in each election except two. Indeed, Junn's (2017) argument for understanding how sexism and racism can function together to undermine voters' choice for women candidates in the U.S. is supported by the research findings of Brian Schaffner, Matthew MacWilliams and Tatishe Nteta (2018) who, after analyzing pre-election data from one YouGov survey involving likely American voters, as well as post-election data from another YouGov survey involving American voters,

found that hostile sexism and racism denial were important factors that influenced white voters, particularly those without college degrees, to choose Donald Trump for president in 2016.

Given the ways in which sexist and/or racist discourses can undermine the likelihood of women in the United States winning party nominee races, and then gaining enough voter support to win general elections for elected political offices, it is encouraging to know that the 2018 American midterm elections not only saw a record-setting number of Democratic women run to serve in local, state, and congressional offices (Alter, 2018), but a record number of women (that is, 126 women) were elected to serve in the 116th United States Congress as a result of those midterm elections (Greenberg, 2018). Although the number of women who served in the 116th Congress was still relatively low, the overall increase was a positive result.

Despite the progress related to representational equality that is reflected in the 2018 midterm congressional results concerning women candidates, I argue that, from a discursive perspective, the impact of sexist, racist, and other oppressive discourses on American voters' electoral choices for those candidates, may have been mitigated by multiple sociopolitical movements that were re-energized partly in response to political realities that occurred between 2016 and 2018. These realities included: the election of Donald Trump; Trump's sexist and racist rhetoric, as well as the discriminatory laws and policies that he attempted, or enacted, through executive order; problematic actions taken by some Trump administration officials who oversaw various departments; and actions taken by some Republican Trump allies in the U.S. Congress. In response to these and other realities, there were examples of a re-energizing of feminist and other gender justice movements, including the 2017 Women's March, and the 2018 Women's March, in the United States and elsewhere, in which people protested against a wide range of gender and other social injustices including, but not limited to, forms of gender

inequality, the undermining of reproductive rights, unjust laws that impact same-sex attracted people, and racism (e.g., Fisher et al., 2017; Kahn, 2018; North, 2018). The high school student–led #NeverAgain movement, in which American youth and adults advocated for gun control to be one of the central ballot box issues of the 2018 midterm elections (e.g., Kirby, 2018; Shear, 2018) was an example of a re-energized gun control movement, which began prior to the 2018 midterm elections and may have impacted the results of those elections to some extent.

In addition to factors that influence people's choices to vote for women candidates to serve in public office, researchers have pointed to other areas of concern that may constrain women's representation and participation in electoral politics. One area of concern is the extent to which sexist and/or negative coverage of women political candidates in the media might dissuade some women from running for public office. One evidence-based source that justifies such a concern is Meredith Conroy, Sarah Oliver, Ian Breckenridge-Jackson and Caroline Heldman's (2015) analytical study. This study investigated gender bias in news media coverage of U.S. vice-presidential candidates between 1984 and 2008. These researchers found that female candidates received more negative coverage than their male vice-presidential counterparts, as well as sexist coverage. Sexist coverage had increased between 1984 and 2008. Amanda Haraldsson and Lena Wängnerud's (2019) exploration of "media sexism"—which they define as "the (re)production of societal sexism through under- and misrepresentation of women in media, leading to a false portrayal of society through a gendered lens" (p. 524)—also indicates that a concern about the potential constraining role sexist discourses can play in women's decisions to run for office is warranted. The results of Haraldsson and Wängnerud's (2019) analytical study involving data from 56 countries around the world, which included Canada and

the United States, suggest that media sexism found within traditional news media may be one of a number of factors that contributes to women's decisions to not pursue public office.

Another area of concern relates to how women politicians are treated while serving in office. For instance, women in public office may experience sexism and sexual harassment in governmental bodies, a reality that Cheryl Collier and Tracey Raney's (2018) research findings speak to within the contexts of Australian, Canadian, and British legislative institutions. Moreover, when various aspects of patriarchal/sexist discourses are pervasive in societies, they can help to undermine how long women in political executive offices serve. For example, Omar Encarnación (2017) discusses how aspects of patriarchal discourses contributed to the problematic impeachment trial of Dilma Rousseff, who was Brazil's first female president. President Rousseff's trial had resulted in her removal from office. Also, Mona Lena Krook (2017) highlights how female/women politicians, political activists, and voters can be disproportionately subjected to physical, psychological, economic, and/or symbolic violence in countries around the world, including the United States, due to the influence of sexism.

While violence is perpetrated against women and men in political office, such violence can be disproportionate in sexist societies. Using survey data from 283 respondents who represented female and male mayors of different cities in the United States, Rebekah Herrick, Sue Thomas, Lori Franklin, Marcia Godwin, Eveline Gnabasik and Jean Schroedel (2019) found that the female respondents experienced more of certain types of abuse and violence than the male respondents. Female mayors experienced more: psychological abuse (e.g., social media comments considered to be disrespectful; threats of violence including, but not limited to, death and rape threats); physical violence (e.g., physical assault; property damages); and sexualized abuse and violence (e.g., experiences involving sexualized language and sexualized acts).

**Considering Flannery's SJM Unit in Light of Sexist and Other Discourses**

- Analytical Question 4: How might aspects and/or effects of sexist and other relevant discourses undermine the consciousness-raising potential of the participant's SJM curriculum with respect to providing students with the opportunity to better understand the: (i) influence of sexism in human lives; and (ii) connections between sexism and oppressive gender realities, like gender injustices, that are or should be particularly relevant to the participant's SJM curriculum?

The dominance of sexist discourses in American society functions to make sexism appear to be unproblematic, normal, or invisible, to voters who participate in elections. For instance, the genderization of human qualities that supports sexist stereotypes can negatively impact voter choice for female/women candidates in partisan party nominee elections, as well as general elections for public office, in the United States (e.g., Bock et al., 2017; Bos, 2011; Paul & Smith, 2008). Moreover, the influence of racist discourses on some Americans can work in conjunction with sexist discourses to negatively impact voter choice for female/women candidates, including among some women, as was the case during the 2016 presidential election in the United States (see Junn, 2017; Schaffner et al., 2018). Providing Grade 7 students with opportunities to make connections between sexism and associated representational inequalities based on sex and gender, and other categories of social difference, and how such connections are operationalized through voter choice in elections, are important because Grade 7 students may not, on their own, be able to make those connections. As Flannery's SJM unit does not have enough explicit learning opportunities for students to recognize and question the possible influence of sexist discourses on voter choice—along with racist and other discourses that can serve to reify sexist influences on voter choice—her SJM unit's consciousness-raising potential is limited.

During our introductory interview, I had asked Flannery what she thought about the relationship between gender injustices and sexist ideologies, expectations, relations, practices, and so on. The following key analytical segment of the associated interview transcript represents part of the response Flannery gave to this question:

> Like I would say…gender injustices have to be corrected if you want the system to change, if you want to move to a place where there is greater gender balance….I don't think too much about how gender injustices and sexism—I'm not so worried about how they interact...[We need to move] towards a place where women feel empowered to do everything and everyone expects them to be doing whatever they're capable of. The important work along that path is to highlight the places where there are inequities, and to highlight moments where people are getting away with [injustices] based on gender—like if [injustices] are happening because of gender….When you hold people accountable for things that are unjust, you're helping to move us forward on the timeline....Life for us [as girls and women] looks really different from [the lives] of people a hundred years ago in terms of what's possible, and what's, like, fairly commonplace. I think there's still a lot of work to be done—there's a lot of movement to happen—but as we continue to hold people accountable, we're forging a path that's more just. (Flannery's Interview-Text 3)

As Flannery's comments suggest here, her SJM unit reflects her desire to see gender justice occur in American politics and society. However, Flannery's comments confirm that she did not intentionally seek to facilitate her Grade 7 students' critical consciousness about the ways in which sexism may have contributed to representational inequalities related to sex and gender in the United States Congress, between 1977 and 2011, when she had designed and taught her unit

for the first time during the 2010 to 2011 school year. As indicated in the above interview excerpt, Flannery does not "think too much about how gender injustices and sexism…interact."

Although it was not Flannery's intent to create consciousness-raising learning opportunities through which her Grade 7 students could interrogate how sexism can play a part in the electoral politics they were considering during Stage 1 of her unit, the research-based evidence and analyses discussed in this chapter suggests that Grade 7 students could potentially benefit from learning tasks that give them the space to critically question, analyze, and reflect on how sexism contributes to representational inequalities based on sex and gender, as well as other gender injustices rooted in sexism, which negatively impact females/women. Not having the opportunities to recognize, critically analyze, and question the possible connections between sexism, and the political underrepresentation of women, undermines the consciousness-raising potential of Flannery's unit. In addition, the consciousness-raising potential of Flannery's SJM unit could be strengthened by enabling seventh graders to use mathematical knowledge, as well as sociopolitical and experience-based knowledge, to explore other types of gender injustices within the U.S. electoral system that disproportionately impact female/women candidates, such as the ways in which sexist discourses can contribute to negative, and even violent, treatment of females/women who are political candidates or political leaders in the United States (e.g., Conroy et. al., 2015; Haraldsson & Wängnerud, 2019; Herrick et. al., 2019; Krook, 2017).

## Concluding Thoughts: Revisiting the Central Research Question

- Central Research Question: When relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society?

As I concluded in Chapter 4, the answers to Analytical Questions 1 to 3 suggest that Flannery's SJM unit about percent change, which she had taught her Grade 7 students in the Spring of 2011, represented a strong consciousness-raising SJM curriculum through which her Grade 7 students had the opportunity to: begin to, or continue to, develop their critical consciousness about representational inequalities in congressional elected politics within the United States, during Stage 1 of the unit; and independently investigate social justice issues that were of interest to them, or learn about social justice issues from their peers' inquiries, during Stage 2 of the unit. During Stage 1 of her SJM unit on percent change, Flannery had intentionally created learning opportunities in which her seventh graders could recognize and critically think about how certain factors, including racism, might contribute to the (re)production of representational inequalities based on ancestry/'race' amongst Members of the United States Congress, between 1977 and 2011. However, as I indicated in my answer to Analytical Question 4, Flannery did not intentionally create learning opportunities through which her Grade 7 students could recognize, and critically think about, how sexism might contribute to the underrepresentation of females/women in the United States Congress over the same 34-year period. The lack of learning opportunities through which Flannery's students could have identified, and critically analyzed, the possible ways by which sexism contributes to representational inequalities based on sex and gender, within electoral politics, served to limit her SJM unit's potential to support her seventh graders' ongoing critical consciousness development about sexism and associated gender injustices in their lives and society.

With the importance of highlighting the relationship between sexism and gender injustices in electoral politics in mind, I argue that the first day's lesson of Flannery's SJM unit on percent change (that is, Stage 1) serves as a strong starting point for a multi-day SJM lesson, a

SJM unit, or a SJM project, that could utilize percent change and/or other mathematical concepts and tools, to support the following three objectives within middle school math classes: (1) help students to critically analyze how and/or why sexism might influence voters' perception, treatment, and views of females/women candidates running for political office; (2) provide students with opportunities to critically think about how sexism can influence people's treatment of women who are elected to public office; and (3) enable students to critically reflect on the aspects of sexism they recognize in various areas of their own lives, and in society, as well as how they might resist the impact of sexism on who they are, and may become, in the world. For example, middle school students may benefit from participating in an interactive guest speaker presentation by a municipal, state, or federal female/woman politician who can share her insights about some of the negative effects that sexism has had on her throughout her career, as well as how she has countered those effects. Keeping these three objectives in mind, a SJM educator could also create complementary activities for students to individually or collectively complete before, and after, their experience of learning from the guest speaker's interactive presentation.

Another example of a learning opportunity that could enable middle school learners to better understand the relationship between sexism and gender injustices in electoral politics, and their own lives, is engaging students in reflective writing through, for instance, handwritten journal entries and/or online blogs. One of the goals of a reflective writing assignment could be to help learners identify, and critically think about, some of the ways that sexism might be present and/or influential in their lives and cultures through news, social and entertainment media, popular music and literature, their interpersonal relationships, and/or other socializing and influential people or products in their online or offline realities. As a follow-up activity meant to enhance students' thinking, questions, and realizations as a result of their reflective writing, a

SJM educator could also develop a small-group, drama-based activity, in which students: share their ideas about sexism and its role in their own lives and in elected politics; and then create and act out a short skit that represents a sex and gender problem they have experienced or learned about (e.g., gender stereotypes about leadership qualities), how such a problem might be rooted in sexism, how that problem can contribute to gender injustices experienced by women in elected politics, and their ideas for changes they and others could make in seeking to solve the problem.

In short, Flannery's SJM unit on percent change can be an inspirational starting point for Flannery, and other middle school SJM educators, to consider the how they could develop and teach a SJM curriculum that more directly supports students' individual, and collective, exploration of the connections between sexism and gender injustices, which are seen in multiple aspects of elected politics and everyday life. Individual moments of reflection on this important relationship, as well as collective activities or investigations in which mathematics is not the only tool that is used to interpret and understand gender injustices, are important because the sexist roots that help to (re)produce gender injustices are not spoken about enough in public discourse, nor are they positioned as some of the reasons for such problems. Such a curriculum has the potential to help middle school youth: better understand the role of sexism in the (re)production of gender injustices within elected politics; begin to, or continue to, recognize how sexism may impact their own thinking about political candidates and leaders; and recognize how sexism may be impacting their views about their own and/or other people's political leadership potential.

Developing and teaching a SJM curriculum that meets the aforementioned learning objectives in ways which can engage middle school students' interests about different realities in the world, as well as help them articulate their own ideas and questions about sexism and associated gender injustices, can be difficult. This was a challenge that Flannery briefly

identified during our introductory interview regarding the responses of some of her Grade 8 students, to whom she had taught her SJM unit on percent change for the first time, before revising it for her Grade 7 math students. Specifically, Flannery had stated: "Some [students] were really curious or angry or emotional about looking at the demographic shifts in the Congress…[Some of the students] weren't actually all that personally curious about it" (Flannery's Interview-Text 1). Nevertheless, despite the challenge of balancing, on the one hand, the intentionality needed to help students recognize the influence of sexism and associated gender injustices in electoral politics, as well as in their own lives, and on the other hand, ensuring that learners have the opportunity to explore their own interests, it is still worth the effort to engage adolescents in a SJM curriculum that incorporates the objectives I have discussed above, as such a curriculum has the potential to contribute to the ongoing development of adolescents' critical consciousness about sexism and associated gender injustices, within and outside of electoral politics, and can help to clarify the importance and benefits of resisting sexism in their own lives, which is part of developing a revolutionary feminist consciousness.

# CHAPTER 6

# ANTHONY'S SJM PROJECT

# FINDINGS AND DISCUSSION (PART 1)

## The Purpose of Anthony's SJM Project

❖ Analytical Question 1: What is the purpose (or significance) of the participant's SJM curriculum for middle school or high school math learners?

When answering Analytical Question 1, I identified the purpose of Anthony's SJM project using relevant key analytical segments of his SJM text. These relevant key analytical segments were taken from: key excerpts of Anthony's second introductory interview transcript related to his discussion of the mathematical goals, social justice oriented goals, and pedagogical goals of his curriculum for Grade 9 math students (see Anthony's Second Interview-Text 1 in Table C1; Anthony's Second Interview-Text 2 in Table C2; Anthony's Second Interview-Text 3 in Table C3; and Anthony's Second Interview-Text 5 in Table C5); as well as the prompts and questions of Anthony's student instruction sheet for his SJM project (see Anthony's SJM Project-Main Text in Table 6.1). Specifically, I identified the following four aspects of Anthony's SJM project, which collectively comprise its purpose.

- Aspect 1: The project seeks to enable students to identify gender realities in Canadian and other societies, for which gender equity might apply, through their initial individual investigation of such realities on Twitter, and then through a more in-depth exploration of one particular gender reality, or central topic, with two other classmates.
- Aspect 2: The project presents students with the opportunity to use the mathematical concepts they have learned about, and/or may be in the process of learning about, as

interpretive tools to understand the central topic related to gender equity, and other relevant issues, they are investigating in their respective three-person group.

- Aspect 3: Through the project, learners are encouraged to reflect on how their use of mathematical concepts as interpretive tools during their small group investigation affected or influenced their understanding of the gender realities related to their group's central topic, as well as how their mathematical and other knowledge-based understanding of those realities might impact their future choices and actions.
- Aspect 4: The project seeks to enable students to use inquiry-based and cooperative (or collaborative) skills to learn about, and gain a deeper understanding of, a topic to which gender equity might apply, partly based on students' own interests and questions.

## Politics and Relevant Knowledge Source(s) of Anthony's SJM Project

### Social Goods of Anthony's SJM Project

❖ Analytical Question 2: What are the major social goods that are directly/explicitly and/or indirectly/implicitly represented in the participant's SJM curriculum (that is, what social ideals, types of social change, educational goals, etc., are represented as good or valuable in the participant's SJM curriculum)?

I identified three major social goods of Anthony's SJM project when I sought to answer Analytical Question 2. My identification of the three social goods was based on key analytical segments of Anthony's SJM text, and was informed by revolutionary feminist and SJM educational perspectives. The three social goods of Anthony's SJM project are listed here.

- Social Good 1: Through Anthony's SJM project, students have the opportunity to explore what gender equity is, and consider reasons why it may be needed, in the contexts of gender realities in Canada (and elsewhere) that they will identify through their inquiries.

- Social Good 2: Anthony's SJM project provides students with the opportunity to engage in inquiries through which they can potentially identify, critically analyze, and better understand oppressive and unjust gender realities they may or may not be experiencing in their own lives, in order to develop a critical consciousness about such realities.
- Social Good 3: During their engagement with Anthony's SJM project, students have the opportunity to learn about how mathematical concepts can be used as interpretive tools to help them identify, and better understand, gender injustices in Canada (and elsewhere).

When answering Analytical Question 2, I recognized that Social Good 1 relates to all four aspects that comprise the purpose of Anthony's SJM project, Social Good 2 relates to Aspect 1 and Aspect 4 of its purpose, and Social Good 3 relates to Aspect 2 and Aspect 3 of its purpose.

***Social Good 1***

The first social good of Anthony's SJM project is apparent through the types of individual and collective tasks Grade 9 students are asked to do for each of the four stages of the project outlined in the student instruction sheet: (1) "Stage One: Observe;" (2) "Stage Two: Plan;" (3) "Stage Three: Do;" and (4) "Stage Four: Reflect and Conclude" (Anthony's SJM Project-Main Text). In the first stage of Anthony's SJM project, students are expected to do the tasks indicated by the following two prompts of the student instruction sheet:

> Stage One: Observe
>
> - Search for *Gender Equity* on Twitter.
> - Read at least 40 different tweets (for each side article that you open and review, you may review 5 fewer tweets).
>
> (Anthony's SJM Project-Main Text)

The two prompts of the first stage of Anthony's SJM project have the potential to enable learners to experience the first goal of Social Good 1—that is, to investigate what gender equity is—when

they "Search for *Gender Equity*" and "Read at least 40 different tweets" about gender equity, which can be decreased by five tweets for each "side article" that they review during their individual inquiries on Twitter. Anthony's parenthetical instruction to students in the second prompt of the "Stage One: Observe" section might also encourage them to seek out sources about issues related to gender equity on Twitter that are information-rich, which could, in turn, increase their exposure to multiple conceptualizations and examples of gender equity, thereby enabling them to more fully experience Social Good 1 of Anthony's SJM project.

Through their initial Twitter search findings about gender equity, students might also experience the second goal of the first social good of Anthony's SJM project: that is, they may identify information sources that highlight some of the reasons why gender equity may be needed in Canada and elsewhere. While instructions to identify the reasons for gender equity are not explicitly articulated by Anthony in his instruction sheet, students may be able to identify some reasons, depending on several factors. These factors include, but are not limited to: the accuracy and quality of the information and data students find on Twitter; the discursive frames with which various types of information, including research-based and other mathematical data, are represented and interpreted by the producers of the information and data; and the discursive frames with which students understand social realities in the world when they do this project.

The "Stage Two: Plan" section of the student instruction sheet states the following:

Stage Two: Plan

- Individually record 3 possible topics that you might explore using mathematics that you have been learning this year.
- Share your possibilities in groups of 3. Choose one topic that your group will choose to explore mathematically.

(Anthony's SJM Project-Main Text).

Table 6.1

*Anthony's SJM Project-Main Text*

Stage One: Observe

- Search for *Gender Equity* on Twitter.
- Read at least 40 different tweets (for each side article that you open and review, you may review 5 fewer tweets).

Stage Two: Plan

- Individually record 3 possible topics that you might explore using mathematics that you have been learning this year.
- Share your possibilities in groups of 3. Choose one topic that your group will choose to explore mathematically.

Stage Three: Do

- Your group will create a product that explains your topic and demonstrates your mathematical understanding of gender equity as it is related to that topic. Criteria for assessment of your products will be co-constructed as a class once your product ideas have been determined.

Stage Four: Reflect and Conclude

- After sharing your product with your classmates, respond to the following reflection questions:

    1. How was mathematics used as a tool for critically thinking about a societal concern (specifically within the main topic of gender equity)?
    2. How did application of mathematics to your chosen topic change your interest and/or understanding of mathematical concepts?
    3. How did your understanding of your chosen topic change from the start of this project to the end of this project?
    4. What are some influences that your mathematical exploration of gender equity as a class might have on your future choices and actions?

Thus, in the second stage of Anthony's SJM project, each student would also have the space to potentially learn about various conceptualizations of gender equity, as well as some of the contexts and reasons why gender equity may be needed. Firstly, each student would be

considering “3 possible topics” related to gender equity that they identified in their individual inquiries during the first stage of the SJM project. Secondly, each student would have the opportunity to discuss their three topics with the members of their three-person group in order that the group could collectively choose a central topic about gender equity. The group members would then investigate their topic collaboratively. These possible outcomes of the second stage of Anthony’s project would potentially help students to meet both goals of Social Good 1.

In the third stage of Anthony’s SJM project, learners are asked to do the following:

Stage Three: Do

- Your group will create a product that explains your topic and demonstrates your mathematical understanding of gender equity as it is related to that topic. Criteria for assessment of your products will be co-constructed as a class once your product ideas have been determined.

(Anthony’s SJM Project-Main Text)

While it is not explicitly stated in the above instruction, Anthony’s discussion of the major topic and educational goals of his SJM project during our second introductory interview indicates that, within their three-person group, students would be creating a product “that explains [their] topic and demonstrates [their] mathematical understanding of gender equity as it is related to that topic,” which may also be based on the potential additional inquiries they perform regarding their group’s central topic. The following comments by Anthony make this expectation clear:

> Okay. So, the big topic is gender equity—that's the umbrella topic—but underneath that students will choose their own version of that. So, I've asked [students]—and I did it myself, I did a Twitter search on gender equity—and I asked them to read at least 40 different tweets, which sounds like a lot but, like, a tweet is so short. But I said for every side article that they open or review they can review five fewer tweets, so that will

> hopefully motivate [students] to review [relevant topics in] a little bit more depth. So, hopefully from that, they'll come up with some possible topics under the umbrella of gender equity. And I've left it completely open to students so that, ideally, what would happen in the situation is they might take a week to do the research on it but, at the end, they'll come back and they'll share with each other what they've found. So, [after] an hour in a class with 25 students, you've got 25 different topics all under the umbrella of gender equity. Then [in their small groups] they can explore [one topic] together in more depth. (Anthony's Second Interview-Text 1)

Through the research they do in order to "explore" their group's gender equity topic "together in more depth," students may also experience Social Good 1 of Anthony's SJM project depending, in part, on the extent to which they are able to think critically about mathematical and other types of data and information they have reviewed in relation to their group's topic.

Once students have completed their investigations about their group's topic and have presented it to their classmates using the product they would have designed during the third stage of Anthony's SJM curriculum, they are given the opportunity to engage in individual reflection by responding to the questions posed under the "Stage Four: Reflect and Conclude" section of the student instruction sheet. Specifically, Grade 9 students are asked to consider the following.

Stage Four: Reflect and Conclude

- After sharing your product with your classmates, respond to the following reflection questions:
    1. How was mathematics used as a tool for critically thinking about a societal concern (specifically within the main topic of gender equity)?

2. How did application of mathematics to your chosen topic change your interest and/or understanding of mathematical concepts?
3. How did your understanding of your chosen topic change from the start of this project to the end of this project?
4. What are some influences that your mathematical exploration of gender equity as a class might have on your future choices and actions?

(Anthony's SJM Project-Main Text)

Contingent, in part, on the discourses that frame the sources of information and data they would have found and analyzed, as well as the discourses that influence their understanding of gender realities, students may be able to better understand some of the reasons why gender equity may be needed when they re-consider the results of their inquiries for Anthony's SJM project in order to reflect on: (A) the role that mathematics "as a tool" might have played in helping them to "critically" think about their group's topic related to gender equity during their response to Question 1; and (B) how the findings of their "mathematical exploration of gender equity as a class" might influence their "future choices and actions" during their response to Question 4.

***Social Good 2***

A potential cumulative effect of ninth graders' engagement with Anthony's SJM curriculum is that, during one or more of the first three stages of it, they may be able to identify, critically analyze, and better understand gender injustices—or put another way, oppressive and unjust gender realities—that are prevalent in Canadian and other societies, which may, in turn, deepen their critical consciousness about such realities. If these outcomes are achieved by students as consequences of their work for Anthony's SJM project, then students may experience Social Good 2 of his curriculum. Although achieving the intended outcomes of Social Good 2 is

not guaranteed for students, it is still possible for them to achieve these outcomes through their individual Twitter searches and inquiries about gender equity during "Stage One: Observe." Students may also achieve the intended outcomes of Social Good 2 through their understanding and representation of the findings related to their group's topic during "Stage Three: Do."

The critical consciousness of students regarding ongoing gender injustices in Canadian and other societies may also be deepened as they listen to, and consider the presentations of, the findings that might emerge from other groups' inquiries into gender equity. Anthony expanded on this possibility during our second introductory interview as follows:

> …Another thing that's in place with this [project] is that [when] they do share [their findings] together, they're not just learning about one aspect of gender equity or gender equality, they'll learn about twenty different topics within there. And then [the class] can come up with themes together. [Students might see that] there are a lot of similarities, a lot of overlap, and by each [student exploring] a different topic or aspect of gender equality or gender equity [as individuals, as members of their small groups and as learners of the inquiries made by other groups], they'll be able to get [a fuller] view. So, the idea that they're looking at society through a societal lens [such as] social media—and that they're also exploring multiple topics—I'm hoping that it would give them a better view. (Anthony's Second Interview-Text 5)

Thus, students may also experience Social Good 2 by listening to other groups' presentations of their gender equity topics, and thinking about their findings. This is particularly possible if their teacher does the kind of activity Anthony proposes Grade 9 students do following their group presentations: that is, encourage students to identify "similarities" amongst the results of their investigations into different topics related to gender equity, and then "come up with themes

together" as a class. Anthony's suggestion that a potential outcome of such a follow-up activity might be that students would have "a better view" of gender injustices is, in my estimation, one way that students' critical consciousness of gender injustices could be strengthened.

Moreover, the aforementioned end-of-project reflection questions posed in the "Stage Four: Reflect and Conclude" section of the student instruction sheet may potentially deepen students' critical consciousness about gender injustices (including gender inequalities), as well as increase their awareness of some of the factors that contribute to the (re)production and normalization of such gender realities, which are partly informed by sexist gender-related ideologies and expectations about people's identities, social practices, behaviours within interpersonal relationships of various kinds, and so forth. Question 4, in particular, has the potential to deepen students' critical consciousness of gender injustices because it invites them to identify and reflect on "some influences that [their] mathematical exploration of gender equity as a class might have on [their] future choices and actions." Through their responses to Question 4, students may recognize, question and seek to change aspects of their own lives—including their views and behaviours related to themselves and others—which reflect sexist and other oppressive discourses that undermine gender equality and people's potential and quality of life.

Social Good 2 is also reflected in one of Anthony's intended pedagogical goals for his SJM project. Specifically, Anthony articulated his belief that one of the benefits of using Twitter as a source for information and data, including mathematical data, about gender realities which require gender equity is that students might be exposed to a range of gender and other social injustices. Anthony's demonstration of this specific consideration of pedagogical intentionality regarding the use of Twitter is indicated in the following introductory interview excerpt:

> I think one of the things that being on Twitter does for them is that it opens up all levels of society. So, they'll see comments that are inappropriate to see in a classroom, but because they're doing it as live research, they'll see things that are reality for them. So, hopefully that will open their eyes to injustice and societal beliefs that are beyond, maybe, what they have [seen or experienced] themselves. So, that's one thing: that it will open their eyes to potential injustice. (Anthony's Second Interview-Text 5)

The actualization of Anthony's belief that, as a result of conducting "live research" on Twitter, students will have the chance to "open their eyes to potential injustice," as well as "see" (or read or hear) about "things that are reality for them," is possible, as is exemplified by some people's use of Twitter to engage in gender justice campaigns or movements like the #BringBackOurGirls campaign (e.g., Carter Olson, 2016) and the #MeToo movement (e.g., Mendes et al., 2018).

***Social Good 3***

The tasks and questions given in the second, third, and fourth stages of the student instruction sheet for Anthony's SJM project, support the possibility that Grade 9 students will experience Social Good 3 of his curriculum. This means that by completing the tasks and responding to the questions of these three stages of the student instruction sheet, learners may recognize how some of the mathematical concepts they have learned about might help them identify and better understand gender injustices in Canada and other parts of the world.

Certain words and phrases of the tasks and questions of the student instruction sheet for the last three stages of Anthony's SJM project invite ninth graders to take specific actions related to their use of mathematics during their individual and collective work. For instance, in the first prompt of "Stage Two: Plan," students would need to assess and apply the mathematics they have learned about to identify three potential gender equity topics that they "might explore using

mathematics," which would be based, initially, on the results of their individual Twitter searches for information and data about realities which may require gender equity. The second prompt in the "Stage Two: Plan" section of the instruction sheet also highlights for students the importance of using mathematical concepts as interpretive tools in their group inquiries because it indicates that they would need to work with two other classmates to decide on, and then "explore mathematically," one central topic related to gender equity.

Words and phrases in both "Stage Three: Do" and "Stage Four: Reflect and Conclude" of Anthony's student instruction sheet also suggest that Grade 9 students may experience Social Good 3. In relation to their group's topic that should be associated with gender equity in some way, students are asked to design a product that "demonstrates [their] mathematical understanding of gender equity" in the third stage of the project. Thus, students are made aware that their "mathematical understanding" of their group's topic is considered important.

Questions 1, 2, and 4 of the "Stage Four: Reflect and Conclude" section of the student instruction sheet also indicate to learners that their thinking about mathematics is an important part of the project. Specifically, ninth graders are expected to consider and evaluate the mathematics that they would have used throughout their project work to respond to these three reflection questions. In Question 1, students are asked to consider how "mathematics" was "used as a tool for critically thinking about a societal concern" related to gender equity. In Question 2, students are asked to reflect on the ways in which the "application of mathematics" regarding their group's central topic might have altered their "interest and/or understanding of mathematical concepts." Finally, as previously discussed, Question 4 requires students to reflect on how their "mathematical exploration of gender equity as a class" may influence their "choices and actions" in the future, which affords them the opportunity to think about how using

mathematics may have contributed to their understanding of gender equity, and the various gender injustices in Canadian society, and other societies, that require gender equity.

**Relevant Knowledge Source(s) of Anthony's SJM Project**

- Analytical Question 3: How are mathematics and other forms of knowledge positioned as interpretive tools through which students might better understand oppressive sociopolitical realities, including gender and other social injustices, that are informed by the purpose and/or social goods of the participant's SJM curriculum?

As discussed above, Anthony's SJM project provides Grade 9 students with the opportunity to explore realities to which gender equity applies. Therefore, the types of realities that students are invited to focus on are oppressive gender realities, including gender injustices, that may underlie the need for gender equity, although this does not mean that other oppressive sociopolitical realities would not be relevant to students' investigations as they engage with Anthony's curriculum. When considered collectively, Social Goods 1, 2 and 3 of Anthony's SJM project, as well as Aspects 1 to 3 of the purpose of this curriculum, indicate that the following forms of knowledge are positioned as relevant for students to use when identifying, analyzing, reflecting on, and/or discussing oppressive gender realities: mathematical knowledge that relates to or describes oppressive gender realities; sociopolitical knowledge about oppressive gender realities; and experience-based knowledge related to oppressive gender realities.

My discussion of the third social good of Anthony's SJM project demonstrates how the language of the tasks or questions posed in the second, third, and fourth stages of his student instruction sheet help to position mathematical knowledge as central to students' inquiries about gender equity. In this same discussion, some of the ways in which mathematical knowledge is positioned as important for students to draw upon during their investigations of their group's

topic are also revealed. In addition to his student instruction sheet, some of Anthony's comments during our second introductory interview suggest that he wants mathematical knowledge to be the central interpretive framework through which ninth graders could come to understand various realities that require gender equity, throughout their project work.

When prompted during our second introductory interview, Anthony noted that data management and proportional reasoning concepts would be the major mathematical concepts students could use in order to understand realities to which gender equity applies (Anthony's Second Interview-Text 3). Anthony then went on to discuss a few possible ways that a high school math teacher might facilitate his project to support students' use of these mathematical concepts, in order to help them think critically about realities requiring gender equity:

> So, if you were to do this as a data management [project], there is the whole data management stream in there. So, you could do an analysis of, say, a week's worth of tweets, collect all those tweets, [and ask] how many of them apply to whatever particular question you've got, like sexism in sports or whatever it happens to be. So, how many tweets are in favour of this? How many tweets are in favour of [that]? You could do it as a survey? You could do that sort of thing pretty easily. It doesn't have to be stuck on Twitter either. [It's] just [that what students find on] Twitter is the basis for their idea [of their group's topic]. So, they could create their own survey and talk about biased and unbiased questions, and then deliver that to their peers. That sort of thing. As far as proportional reasoning is concerned, again, when they do the data analysis of such a survey, they could come up with their own proportional reasoning questions in terms of "How might this apply across Peel?" [or] "How might this apply across Ontario

> compared to other countries?" Like, that sort of thing. And you would use proportional reasoning to answer those questions. (Anthony's Second Interview-Text 3)

The above interview excerpt reflects that Anthony intends for students who engage with his SJM project to use mathematical knowledge as an interpretive framework to identify, analyze, discuss, and better understand gender injustices in the world, such as "sexism in sports."

As indicated in my discussion of what I have identified as Social Good 3 of Anthony's SJM project, the student instruction sheet positions mathematical knowledge as knowledge that can enhance Grade 9 students' understanding of oppressive gender realities to which gender equity may be applied. This positioning of mathematical knowledge supports Aspects 2 and 3 of the purpose of Anthony's SJM project. However, because Anthony's SJM project intends for Grade 9 students to explore information and data about realities that require gender equity from different sources—some of which they may initially identify during their searches on Twitter—they could benefit from being given a direct instruction to critically think about how mathematical knowledge can be intentionally, or unintentionally, generated and/or represented in misleading ways by individuals and organizations, particularly when mathematical/statistical data and other research-based evidence about oppressive gender realities are discussed. One example of the importance of critically examining information about gender injustices to which gender equity may be applied is how the worse forms of heterosexual intimate partner violence (IPV) are typically experienced by women at the hands of their male partners. This reality has been obscured due to gender symmetry claims made about IPV over the years, which has been due to a number of factors including methodological problems associated with collecting and analysing data about IPV experiences, as well as the analytical interpretations of misleading

research findings concerning IPV experiences (see, for example, Myhill, 2015, regarding IPV in the UK, and Dragiewicz & DeKeseredy, 2012, concerning IPV in Canada).

Unlike the case with mathematical knowledge, both sociopolitical knowledge and experience-based knowledge are *indirectly* positioned as important interpretive tools through which high school students might better understand oppressive gender realities, since learners are asked to investigate gender equity broadly and within specific topics (or contexts) throughout their engagement with Anthony's SJM project. With this curriculum, students are given the opportunity to build and use sociopolitical knowledge because the focus of the Anthony's curriculum centers around what can be described as sociopolitical contexts: gender equity, which is the explicit context; and the implicit contexts of specific oppressive gender realities to which gender equity might apply. Moreover, because oppressive gender realities involve people's lived experiences of such realities—which include gender inequalities, as well as androcentrism, misogyny, and other forms of sexist oppression—students' investigations about oppressive gender realities will likely enable them to access and use experience-based knowledge.

Based on the language used in the tasks and questions posed in "Stage Two: Plan," "Stage Three: Do" and "Stage Four: Reflect and Conclude" of Anthony's student instruction sheet (see Table 6.1), mathematical knowledge is positioned as the most important type of knowledge ninth graders should use in order to identify and understand gender equity in general, and to do the same with their respective group's gender equity topic, specifically. Most of my discussion about Social Good 3 of Anthony's SJM project demonstrates this point. In particular, I noted how certain words and phrases are used to encourage Grade 9 learners to demonstrate mathematical knowledge and understanding during their research-based inquiries, analyses, discussions, and project product formation, and during their reflection on their group's topic.

However, the privileging of mathematical knowledge in Anthony's SJM project over sociopolitical knowledge and experience-based knowledge may serve to, unintentionally, limit students' recognition of, and critical thinking about, some of the underlying root causes of oppressive gender realities, including gender injustices, that they will likely learn about through their individual and/or collective investigations related to realities requiring gender equity. The subordination of sociopolitical and experience-based knowledge is problematic partly because some of the underlying root causes of oppressive gender realities are informed by sexist discourses, as well as discourses that directly, or indirectly, support aspects of sexist discourses. Moreover, such root causes will require learners' use of sociopolitical knowledge and experience-based knowledge. Thus, to better support Grade 9 students' critical consciousness development about oppressive gender realities for which gender equity may be needed, it is important that they have opportunities during their engagement with Anthony's SJM project to recognize, critically analyze, and understand oppressive gender realities, *and* their root causes, using mathematical, sociopolitical, and experience-based knowledge in a balanced way.

## Concluding Thoughts

Anthony designed a SJM project in which Grade 9 math students could engage in their own individual inquiries about realities that may require gender equity, using Twitter as an initial information and data source, and then use their initial findings about gender equity issues to discuss and choose a central gender equity topic within in a three-member group. Grade 9 students who engage with Anthony's SJM project are encouraged to use mathematical concepts as interpretive tools in order to explore their group's topic and co-create an appropriate product that demonstrates their understanding of that topic, as well as the mathematics they used. The end of Anthony's SJM project provides Grade 9 students with the opportunities to: present their

products to their classmates; as well as engage in personal reflection about their learning of their group's topic and their use of the mathematics that enabled them to understand it.

Social Goods 1 to 3 of Anthony's SJM project, as well as Aspects 1 to 4 of its purpose, all of which were identified through the process of answering Analytical Questions 1 and 2, contribute to making it a strong SJM curriculum which can potentially increase students' critical consciousness about oppressive gender realities (including gender injustices) that are present in Canada and elsewhere, as well as in their own lives, and to which gender equity is applicable. My answer to Analytical Question 3 demonstrates that Grade 9 math students' critical consciousness development about gender equity, and the realities for which it is applicable, is supported directly by mathematical knowledge, and indirectly by sociopolitical knowledge and experience-based knowledge. Students who engage with Anthony's SJM project are likely to focus on mathematical concepts as the primary interpretive tools through which they can understand their respective group's topic due to how the use of mathematical knowledge is emphasized over the other two types of knowledge in Anthony's student instruction sheet for the project. In the next chapter, I will contextualize and discuss my answer to Analytical Question 4. I will then share my answer to this study's central research question concerning Anthony's SJM project based on the findings associated with Analytical Questions 1 to 4.

# CHAPTER 7

# ANTHONY'S SJM PROJECT

# FINDINGS AND DISCUSSION (PART 2)

## Key Insights Related to Relevant Discourses

When I sought to answer Analytical Question 4 during my analysis of Anthony's SJM project, I chose to avoid making assumptions about what a particular group of Grade 9 math students would initially find out through their Twitter inquiries about gender equity and the realities to which it is applicable. I also avoided assuming what students would choose as their three-member group's gender equity topic, as well as what they would learn about during their cooperative inquiries and related project work. Instead, I considered how certain notions of gender equity might limit Grade 9 students' understanding of gender injustices that are rooted in sexism, and I considered the use of Twitter as an initial source of information and data. I made this choice because the conception of gender equity and the use of Twitter are positioned as central to Grade 9 students' engagement with Anthony's SJM project. Before sharing my answer to Analytical Question 4, I will discuss a few insights related to both considerations.

### Considering Sexism When Thinking About Gender Equity

In response to a question regarding his view about the relationship between sexism and gender injustices during our second introductory interview, Anthony had noted that he not only thinks there is a relationship between these realities, but that this relationship can limit any person, regardless of their sex, in various ways. Anthony discussed several examples of sexism in professional and amateur sports as part of his support of this view. In one example, Anthony

recounts a couple manifestations of sexist notions of sex and gender within professional hockey that came from some fans, as well as from some hockey officials:

> There's a female hockey player who's playing for a potential NHL team—like, it's one of the farm teams for the NHL—and the comments around her are way more negative. The team is very supportive of her, but the fans aren't, and fans from other teams aren't. And it's not… Like, she hasn't played a game yet. As a goaltender, as well, you don't need to be six feet, five inches, and you don't need to be 400 pounds. All you need to be is someone capable of stopping the puck with quick reflexes and flexibility. A goaltender's the perfect position for someone that, maybe, isn't a big bruiser of a person. There are small players in the NHL, but you don't hear those things about them. But because she's female, you do. So, that instant injustice sits there. And that translates, as well, to small men who want to play in the NHL—that they can't be as good because they're smaller. So, I mean [sexism and gender injustices are] connected directly, to me. (Anthony's Second Interview-Text 4)

A brief look at the broad context of sports helps to demonstrate that it is indeed useful, and even necessary, to consider the influence of sexist discourses, as well as other dominant discourses that unintentionally support sexism, when we think about gender equity in sports-based contexts. In North American sports, as in other areas of social life, gender justice has often been understood through the liberal discursive lens of equal representation (that is, representational equality), which is sometimes associated with equality of opportunities for all people. Moreover, within different social contexts, including sports-based contexts, representational equality can be more easily tracked through mathematical/statistical measures. However, while representational equality is important to building a more just world for

everyone, representational equality, as well as equality of opportunities, are not, in and of themselves, the only solutions to the problem of gender injustices, especially for those gender injustices that are due to the normalization and acceptance of overt and subtle sexist gender ideologies, practices, power relations, identity-related expectations and norms, etc.

Research studies have documented notable increases in girls' and women's participation in some sports and physical activities over the last few decades in Canada (e.g., Adams & Leavitt, 2018) and the United States (e.g., Rauscher & Cooky, 2016). However, the liberal oriented emphasis on equality of opportunities in sports has not proven to be enough to combat the presence and impact of sexism that serve to undermine girls' and women's experiences in various roles within professional and recreational sports. For instance, Jason Laurendeau and Nancy Sharara (2008) speak to the limitations that liberal notions like access and individual effort have on combating gender injustice in sports. In their 2008 article, Laurendeau and Sharara report on findings from their respective research studies about women and men who, for the most part, play in the male-dominated action sports of skydiving and snowboarding in Canada recreationally. Some of their findings revealed that the women participants had to deal with sexist expectations, treatment, behaviours and/or practices in these sports. When contextualizing their respective research studies in their paper, Laurendeau and Sharara (2008) noted that liberal feminist notions of sports can serve to downplay the need for the kind of structural changes that could help to make sports better for everyone, stating:

> The liberal-feminist agenda of achieving improved sporting access for women has seen some success. A central question, however, is "access to what?" If women are making inroads into sport without challenging assumptions and structures that privilege men over

> women and particular kinds of men over others, then the transformative potential of their entrance is limited at best. (pp. 27–28)

One critical takeaway from Laurendeau and Sharara's (2008) respective research findings is that liberal or liberal feminist approaches to increasing gender equality in sports are not enough to fully address sports-based gender injustices that are informed by aspects of sexist discourses. This insight highlights the importance of using a conceptualization of gender equity that can sufficiently address and change gender injustices rooted in sexism and, with respect to North American sports-based contexts, such a conceptualization of gender equity is warranted since gender injustices in sports that are influenced by sexist discourses are well documented. For instance, sexist gender expectations that limit some girls' interest and participation in sports and physical activities may be due, in part, to sexist gender socialization that boys and girls may experience within, and outside of, sports contexts (Mullins, 2015). Other gender injustices in sports-based contexts that are (at least) partly informed by sexist discourses include: the perceptions of some female high school athletes that they are receiving gender discrimination from peers, teachers, and administrators (Knifsend & Graham, 2012); low media coverage of female's/women's sports compared to male's/men's sports (Cooky et al., 2015; Fink, 2015); and the negative impact that low coverage of women's sports, and sexist coverage of female athletes, can have on viewers' perceptions of women's sports and female athletes (Fink, 2015).

There are other social contexts in which the way gender equity is conceptualized matters in relation to how people use it to understand, address, and change gender injustices that are informed by sexist discourses. For example, Facio and Morgan (2009) argue that gender equity, within a human rights perspective, can be subjectively defined and applied by authorities in order to undermine the kind of substantive gender equality advocated within the United Nation's

Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW). These legal scholars point out, for instance, that in many African countries some people view it as equitable for women to not be given an inheritance from their fathers because of the sexist expectation that they will not need to become financial providers within their families. In other words, when gender equity is informed by sexist discourses and applied to gender injustices, it can become a barrier to gender equality. Facio and Morgan also note that, unlike equality, equity is not always a term associated with human rights laws and treaties and, thus, it may not provide the means through which people can adequately seek justice for gender-based human rights violations through their country's legal system or through human rights commissions.

**About Using Twitter as an Initial Source of Information and Data**

A major challenge with using Twitter as an initial source of information and data for any inquiry about gender injustices is that anti-feminist and sexist views about gender injustices, which are articulated by some individuals and organizations on Twitter, can obscure truths about those injustices, as well as obscure how sexism (re)produces those injustices. The various misrepresentations of gender injustices that are rooted in sexism can be communicated through tweets, as well as the articles, websites, or other online content accessed through tweets. For instance, with respect to the social problem sexual violence, Lise Gotell and Emily Dutton (2016) discuss the ways that anti-feminist men's rights activist discourses, which are informed by sexist discourses, seek to refute statistical and other evidence that point to the gendered nature of sexual violence against women through organizational websites and other online platforms, as well as through their activism in offline spaces, like university campuses. Twitter is no exception to the presence of anti-feminist men's rights activist discourses, as the research of Alyssa Harlow, Sydney Willis, Meghan Smith and Emily Rothman (2018) reveal. Through their

directed content analysis of 1, 493 English-language tweets related to the sexual violence (SV) prevention campaign #HowIWillChange, which sought to support the #MeToo movement, Harlow et al. (2018) found that almost a quarter of the tweets negatively addressed this specific SV prevention campaign, as well as sexual violence against females/women in general. Harlow et al. note that some of the negative tweets reflected rhetoric of sexist and anti-feminist men's rights activist discourses that deny the reality of the gendered nature of sexual violence.

**Considering Anthony's SJM Project in Light of Sexist and Other Discourses**

- Analytical Question 4: How might aspects and/or effects of sexist and other relevant discourses undermine the consciousness-raising potential of the participant's SJM curriculum with respect to providing students with the opportunity to better understand the: (i) influence of sexism in human lives; and (ii) connections between sexism and oppressive gender realities, like gender injustices, that are or should be particularly relevant to the participant's SJM curriculum?

Sexist discourses, and prevalent discourses like liberal and liberal feminist discourses, can position gender equity in ways that ignore or downplay the connections between sexism and oppressive gender realities, including gender injustices, in various contexts. Such contexts include, but are not limited to, human rights violations (e.g., Facio & Morgan, 2009) and sports-based injustices (e.g., Laurendeau & Sharara, 2008). As a result, I contend that, within gender and other social justice frameworks, it is more helpful to seek an understanding of oppressive gender realities present in our individual lives, our social spheres, and society-at-large, by first recognizing how the manifestations of sexist discourses contribute to those unjust gender realities. Drawing from hooks' (1984; 2000) insights about the benefits of revolutionary feminist consciousness for people of all ages, I support a conceptualization of *gender equity* that positions

it as *a set of actions which seek to help people recognize and change the factors that function to (re)produce gender injustices including, but not limited to, sexist gender ideologies, practices, power relations, and sex-related and gender-related expectations and norms.*

This revolutionary feminist conceptualization of gender equity has the potential to better support Grade 9 math students' critical consciousness development about sexism and associated gender injustices when they engage Anthony's SJM project. Thus, I posit that not providing Grade 9 math students with the space to critically think about gender equity, in light of how aspects of sexist discourses, as well as liberal discourses, liberal feminist discourses, and other prevalent discourses in Canada that may obscure or downplay some of the connections between sexism and gender injustices, could serve to limit math learners' understanding of the notion and application of gender equity. Moreover, having a limited understanding of gender equity may be a barrier to some Grade 9 students' revolutionary feminist consciousness development about any of the relevant links between sexism and the gender injustices they identify during their individual and/or collective work for Anthony's SJM project. These two interrelated limitations can serve to undermine the consciousness-raising potential of Anthony's SJM curriculum.

It is more than likely that Grade 9 mathematics students, who engage with Anthony's SJM project, will encounter misleading informational and data-based results about gender equity issues and topics, produced by individuals and organizations, during their Twitter searches and other potential research-based inquiries, which will likely include mathematical, sociopolitical, and/or experience-based knowledge. Such potential outcomes may be due to the production or interpretation of information and data through frameworks that are informed by sexist discourses and other discourses that intentionally, or unintentionally, reify aspects of sexist discourses. Misleading information, data, and any of the three types of knowledge can limit or obscure

Grade 9 math students' understanding of how sexism contributes to unjust sex and gender realities in North American and other societies. Thus, it is important to be concerned about the possibility that only some students who engage with Anthony's SJM project will be able to make connections between sexism and relevant gender injustices on their own without learning about a revolutionary feminist conceptualization of gender equity, such as the one I defined above, before, or at the beginning of, their exploration of Anthony's SJM curriculum.

During our second introductory interview, Anthony noted that he does not intend for students' project work about gender equity to be "stuck on Twitter" (Anthony's Second Interview-Text 3). However, Anthony does intend that students' initial Twitter findings on gender equity will become "the basis for their idea [of their group's topic]" (Anthony's Second Interview-Text 3). Although it is not a given, the privileging of Twitter as an initial source of information and data could potentially limit students' findings about some oppressive gender realities that require gender equity. The possibility of such an outcome is exemplified by the fact that there are anti-feminist men's rights activist discourses present on Twitter that obscure the connection between sexism and the gendered nature of sexual violence against women (e.g., Harlow, et. al., 2018). Nonetheless, the limitation of students' initial findings related to gender equity could be mitigated if they are encouraged by the math teacher who engages them with Anthony's SJM project to also conduct initial searches on other social media platforms and websites. Three examples of online sources of information and data include: (1) trustworthy radical (or gender critical) feminist social media platforms; (2) reliable online research-based publications produced by radical (or gender critical) feminist scholars and/or organizations; and (3) reliable online research-based publications produced by local, national, or international

organizations that are committed to supporting gender justice in ways which do not ignore biological realities that uniquely impact females/girls/women and same-sex attracted people.

## Concluding Thoughts: Revisiting the Central Research Question

- Central Research Question: When relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society?

Anthony's SJM project about gender equity is an open-ended, research-based mathematical inquiry through which Grade 9 math students are given the opportunity to independently identify, and think about, gender-related realities that require gender equity—that is, oppressive gender realities, including gender injustices—and then co-construct a product that connects to their respective three-person group's topic about a reality for which gender equity is needed. After each group presents the product about their topic to their classmates, Grade 9 math students are expected to reflect on the gender equity topic that their group investigated, as well as the mathematics they used to understand their group's topic. Based on my analysis of Anthony's SJM project, the answers to Analytical Questions 1 to 3 indicate that, overall, his SJM project represents a strong consciousness-raising SJM curriculum about gender equity.

However, as indicated in the discussion of my response to Analytical Question 4, sexist discourses, as well as prevalent discourses like various liberal discourses, can function to limit people's conceptual understanding of gender equity when conceptions of gender equity overlook or dismiss how sexist gender ideologies, practices, power relations, sex and gender expectations, etc., contribute to gender injustices and other oppressive gender realities. If Grade 9 math students work with such conceptions of gender equity, it may not only limit their understanding

of gender equity but, more importantly, it may limit the extent to which they recognize, and better understand, the crucial connections between sexism and gender injustices that require gender equity. Also, when sexist discourses, anti-feminist men's rights activist discourses, and other discourses that support sexism directly, or indirectly, influence the knowledge reflected in the sources of information and data that Grade 9 students access during their Twitter searches, and other potential inquiries, they may have difficulties identifying, and better understanding, the sexist roots of gender injustices that they, and others, may confront in their lives and society.

Taken collectively, the findings associated with Analytical Questions 1 to 4 suggest that Anthony's SJM project could function as an inspirational template for a SJM project that seeks to explicitly support Grade 9 math students' ongoing critical consciousness development about sexism and associated gender injustices—that is, their revolutionary feminist consciousness development—as a result of their inquiries about realities that require gender equity. To develop a SJM project that could meet this educational goal, some issues related to Anthony's SJM project should be considered. I will discuss a few issues and make related recommendations.

One of the main issues I noticed during my consideration of Analytical Question 3 was that mathematical knowledge is privileged over sociopolitical knowledge, and experience-based knowledge, in Anthony's student instruction sheet. In a non-SJM curriculum whose purpose and objectives are strictly mathematical in nature, this might be more than enough. Yet, within critical mathematics education/SJM education, one of the central goals is to help students build emancipatory knowledge in order to develop their critical consciousness about various social injustices that are occurring in their lives, their society, and/or the world-at-large. Thus, expanding Anthony's intended curriculum in ways that could help students to explicitly balance all three types of knowledge would, likely, better support their production of the emancipatory

knowledge needed for their ongoing critical consciousness development about sexism and associated gender injustices that require gender equity. For instance, adding related problem-posing questions or prompts within the student instruction sheet itself, in order to meet this key goal, would likely be helpful. Also, constructing an accompanying short resource for SJM teachers that has suggestions about how to help students better integrate all three types of knowledge as they conduct their investigations, and complete their project-based products, could also serve to strengthen the transformative potential of Anthony's SJM project.

In order to build and use emancipatory knowledge, students also need to engage in critical reflection of the results of their project work, in ways that can enable them to integrate the three aforementioned types of knowledge. For example, the last question in the "Stage Four: Reflect and Conclude" section of the student instruction sheet provides a good consciousness-raising learning opportunity for students to potentially identify how they might resist, or challenge, sexist and other underlying factors that help to (re)produce oppressive gender realities that require gender equity. In order to ensure that this transformative outcome can occur amongst students, it would be helpful to revise or add questions to the fourth stage which prompt learners to identify, and critically reflect upon, for instance: 1) the connections between oppressive gender realities and sexism; and 2) the ways in which they, or others, may be unconsciously and unintentionally (re)producing sexist and oppressive gender realities in their lives. Critical reflection has the potential to extend students' learning on a personal level, as well as make the insights they gain from their mathematical analysis of their team's topic more meaningful. Such outcomes could occur for students since critical reflection has the potential to help them consider why, and how, they can change their thinking and actions to counter the

negative consequences that they, or others, may experience as a result of sexism, and associated gender injustices, which require the application of gender equity.

Due to sexist discourses, anti-feminist men's rights activist discourses that support sexism, other discourses of hierarchy, domination, and subordination, as well as prevalent discourses that can unintentionally support, downplay, and/or obscure the connections between sexism and gender injustices rooted in sexism, including liberal discourses and liberal feminist discourses, it would be helpful for Grade 9 students to have the opportunity to learn the kind of revolutionary feminist conceptualization of gender equity that I previously articulated, because such a conceptualization of gender equity explicitly takes sexism into account. As I indicated earlier, it would be best if such an understanding of gender equity were introduced to Grade 9 students before they begin, or as they begin, Anthony's SJM project. For example, an in-class problem-posing oriented activity, followed by a class discussion, could precede the introduction of Anthony's SJM project, in order to help students understand a revolutionary feminist view of gender equity, which could help them critically question the reasons for oppressive gender realities that require gender equity. Such a learning opportunity could strengthen students' abilities to navigate, and refine, their Twitter searches during their work in the "Stage One: Observe" section of the student instruction sheet. Also, this learning opportunity can potentially, help ninth graders refine the skills needed to identify more informed, insightful, and reliable information and data sources about gender-related realities that require gender equity. A pre-project activity like this could help students formulate richer questions for the topics they will study in more depth within their small groups, thereby potentially enabling them to more keenly understand some of the underlying factors that contribute to gender injustices rooted in sexism.

With respect to the initial source of information and data that is privileged in the student instruction sheet for Anthony's SJM project, how a SJM teacher might facilitate their students' analyses of their initial Twitter-based findings is important. As in other online social spaces, Twitter is a platform through which high school students will likely encounter information and data involving mathematical, sociopolitical, and/or experience-based knowledge about oppressive gender realities that are informed by sexist discourses, as well as other discourses which function to directly, or indirectly, obscure the connections between sexism and associated gender injustices. Thus, the extent to which students can understand the links between sexism and associated gender injustices, in Canada and elsewhere, may be limited.

Revising Anthony's SJM project in order to account for the possibility that Grade 9 students may encounter misleading information, data, and knowledge during their Twitter searches, and other potential research, could involve expanding the tasks in the "Stage one: Observe" section of the student instruction sheet in ways that could mitigate such outcomes. As was alluded to earlier, students could be instructed to learn about gender equity through additional sources of information and data that consider gender equity from a revolutionary feminist perspective. Such sources of information and data could include websites of radical (or gender critical) feminist scholars and organizations, as well as radical feminist (or gender critical) social media platforms. Also, when students are conducting searches about gender equity on Twitter, they could be instructed to ensure that they find tweets from organizations which are committed to countering gender injustices associated with sexism.

Whatever changes might be done to extend the transformative potential of Anthony's SJM project by a SJM educator who uses it, or by Anthony himself, his curriculum on gender equity provides a good foundation on which to facilitate learning opportunities for adolescents,

during which they can develop a meaningful critical consciousness about gender injustices in Canada and elsewhere. This is partly due to the purpose and social goods of Anthony's SJM curriculum. However, in order to facilitate students' critical consciousness development regarding gender injustices that require gender equity—that is, in order to support students' revolutionary consciousness development about sexism and associated gender injustices, for which gender equity is needed—consciousness-raising learning opportunities should be created that allow Grade 9 math students to explicitly, and critically, think about some of the connections between sexism and gender injustices requiring gender equity, as well as consider how sexist discourses and, where applicable, other discourses that directly, or indirectly, support the taken-for-granted consequences of sexist discourses, help to (re)produce those gender injustices.

# CHAPTER 8

# DAVID'S SJM LESSON

# FINDINGS AND DISCUSSION (PART 1)

## The Purpose of the David's SJM Lesson

- Analytical Question 1: What is the purpose (or significance) of the participant's SJM curriculum for middle school or high school math learners?

As part of his varied SJM curricular lessons for the 2014 to 2015 school year, which sought to address various social injustices, David wanted his students to engage in SJM curricula that would allow them to critically think about, and better understand, different types of gender-based violence. One of the lessons David was developing and planning to teach when we had met for our second introductory interview was a lesson for his Grade 8 mathematics class about the ongoing crisis of missing and murdered Indigenous women and girls (MMIWG[8]) in Canada. David entitled this lesson *Missing*. As with my findings for Analytical Question 1 related to Flannery's and Anthony's SJM curricula, I found that there were multiple aspects of *Missing* which comprise its overall purpose. The key analytical segments of David's SJM text that support the multi-dimensional purpose of *Missing* includes: David's student activity sheets for *Missing* (see David's SJM Lesson-Text 1 in Table 8.1 and David's SJM Lesson-Text 2 in Table 8.2); David's lesson plan for *Missing* (see David's SJM Lesson-Text 3 in Table 8.3 and David's

[8] The acronym MMIWG for "missing and murdered Indigenous women and girls" has been used: in the Government of Canada's official website for the national inquiry into the crisis (https://www.mmiwg-ffada.ca/); by Indigenous feminist activists in their analyses of the crisis and the national inquiry (e.g., Blaney, 2018; Smiley, 2016); and through online commentary and reports about VAIWG by Indigenous feminist organizations (e.g., Aboriginal Women's Action Network) and Indigenous women's organizations (e.g., Native Women's Association of Canada).

SJM Lesson-Text 4 in Table 8.4), and David's discussion of his intended mathematical and social justice oriented goals for the lesson during our second introductory interview (see David's Second Interview-Text 2 in Table D4 and David's Second Interview-Text 3 in Table D5). The five aspects of David's SJM lesson that constitute its purpose are given in the following list.

- Aspect 1: Through the lesson, students have the opportunity to learn about and critically analyze the reality of missing and murdered Indigenous women and girls in Canada, as well as oppressive sociopolitical factors and realities that might be contributing to this crisis, within a historical and sociopolitical framework (that is, within a framework that affords students the opportunity to consider how oppressive sociopolitical factors and realities of the past and the present may be contributing to the MMIWG crisis in Canada).
- Aspect 2: The lesson seeks to support Grade 8 students' development of an intersectional understanding of violence against Indigenous women and girls (VAIWG[9]) with respect to categories of social difference including, but not limited to, socioeconomic class, ancestry/'race,' and sex and gender, which are relevant to the MMIWG crisis in Canada.
- Aspect 3: By engaging with *Missing*, students can begin or continue to learn, and use, mathematical concepts, as well as mathematical ways of thinking, as interpretive tools, in order to develop a critical consciousness about the MMIWG crisis in Canada, including some of the underlying factors that have contributed, and are contributing, to the crisis.
- Aspect 4: As part of their critical consciousness development about systemic VAIWG, learners are given the opportunity to develop their sense of agency by supporting efforts to build a critical and social consciousness about the MMIWG crisis in Canadian society.

[9] While I use the acronym VAIWG to denote "violence against Indigenous women and girls," as well as the acronym VAIW to denote "violence against Indigenous women" in this dissertation, I make no claim to be the first or only person to use these acronyms for these realities.

- Aspect 5: Over the course of their exploration of *Missing*, students have opportunities to review, analyze, and critically question research-based evidence relevant to the lesson, including statistical data, in order to recognize the ways in which mathematical data, as well as the generation and interpretation of mathematical data, can reveal or obscure the reality of violence against Indigenous women and girls in Canada, and some of the factors and realities that can contribute to such violence.

**Politics and Relevant Knowledge Source(s) of David's SJM Curriculum**

**Social Goods of David's SJM Lesson**

❖ Analytical Question 2: What are the major social goods that are directly/explicitly and/or indirectly/implicitly represented in the participant's SJM curriculum (that is, what social ideals, types of social change, educational goals, etc., are represented as good or valuable in the participant's SJM curriculum)?

As a result of seeking an answer to Analytical Question 2, I identified three major social goods of *Missing* based on key analytical segments of David's SJM text, which I will discuss in more detail below. As with the other SJM curricula analyzed in this study, my identification of the social goods of David's SJM lesson was informed by a social justice oriented educational perspective and a revolutionary feminist perspective. The three social goods are listed here.

- Social Good 1: Through their engagement with *Missing*, students are given multiple opportunities to critically analyze and understand violence against women and girls in an intersectional way and, as a potential consequence, further develop a critical consciousness about gender-based violence as one type of gender injustice.
- Social Good 2: Students are provided with opportunities to recognize how mathematics can be used to give insight into gender injustices such as VAIWG because they are

encouraged to use mathematical concepts and ways of thinking as one set of multiple interpretive tools through which they can identify, and better understand, such injustices.

- Social Good 3: Students are presented with the opportunity to begin or continue to develop their sense of agency in terms of supporting actions that address, and can potentially change, gender and other social injustices associated with the MMIWG crisis.

These three social goods of *Missing* connect to one or more of the five aspects that constitute the purpose of the lesson: Social Good 1 relates to Aspect 1 to Aspect 4; Social Good 2 connects to Aspect 3 and Aspect 5; and Social Good 3 relates to Aspect 4.

***Social Good 1***

Giving students the opportunities to critically analyze VAWG in an intersectional way, in order to further support their critical consciousness development regarding gender-based violence—that is, what I have identified as the first social good of *Missing*—was the second of three major intended educational goals for the lesson, which David had described in our second introductory interview. Specifically, David stated the following:

> The second [goal of *Missing*] would be to introduce or maintain a focus on the intersectionality of this particular issue. So, you're dealing with race and class and gender and colonialism. I think it's a rich subject [about which students can] look at intersectionality. (David's Second Interview-Text 2)

Based on David's student activity sheets and lesson plan for *Missing*, the potential that Social Good 1 can be experienced by Grade 8 students is high, particularly during the first three parts of the lesson that correspond to the sections of the student activity sheets entitled "Setting the Stage…," "Opening Question…," and "Understanding Using Math…" Some of the key analytical segments of the student activity sheets and lesson plan support this finding.

Table 8.1

*David's SJM Lesson-Text 1*

Part of the written content from the "Setting the Stage…" section of the student activity sheets for *Missing*:

We're talking about so many layers of violence, so many generations of loss, and it's all covered up in layers of silence…in order for us to move ahead, we have to deal with all the things people don't want to talk about.

Beverley Jacobs

Between 1980 and 2012 in Canada, 1,017 Indigenous women have been killed and at least 164 more are missing.[1] This has sparked 29 official inquiries that have collectively demanded more than 500 actions to resolve the problem. Now there are calls for a *national* public inquiry.[2] And the Prime Minister has recently promised to launch one.[3]

The historical record of the treatment of First Nations peoples in Canada is rife with human rights violations: indigenous culture and religion have been banned, voting rights were non-existent until 1960, emotional, physical and sexual abuse occurred within government mandated residential schools (1800s – 1996), and laws have been made, like the Indian Act, that to this day limit and frame First Nations rights within this country.[4]

When widespread racism, poverty, sexism, misogyny, limited access to government services and radically different living conditions combine together, the risk of violence escalates. As Amnesty International writes: "This violence against Indigenous women and girls has deep roots in racism, marginalization and poverty."[5]

The "Opening Question…" of the student activity sheets for *Missing*:

Why are the historical record and the current reality of injustice *both* important to understanding the issue of missing and murdered aboriginal women and girls in Canada?

Two of the 12 questions from the "Understanding Using Math…" section of the student activity sheets for *Missing*:

*Question 3*:
The Native Women's Association of Canada has tracked missing and murdered Aboriginal women and girls. Since March 31st, 2010 there have been 582 cases, as follows[7]:

| | |
|---|---|
| 67% murder cases | 4% suspicious deaths |
| 20% missing women or girls | 9% the nature of the case is unknown |

a. Find the actual number of each group of people based on the percentages.
b. Graph the groups in a pie chart.
c. Why do you think the category 'suspicious deaths' is included?

*Question 4*:
Aboriginal women are 4.3% of the female population in Canada. The total number of homicides across Canada between 1980 and 2012 was 20,313, of which 32% were female victims. If the Aboriginal women that were murdered is 1,017, what percentage is that of the total female victims and how does it compare to the percentage of Aboriginal women in Canada?

David's footnotes for the content cited in this table:

[1] RCMP. Missing and Murdered Aboriginal Women: A National Operational Overview. 2014.
[2] Anaya, James. Report of the Special Rapporteur on he rights of indigenous people. UN Human Rights Council. 27th Session.
[3] http://www.cbc.ca/news/aboriginal/police-forces-need-culture-change-trudeau-1.3428530
[4] Ibid.
[5] http://www.amnesty.ca/sites/default/files/iwfa_submission_amnesty_international_february_2014_-_final.pdf
[7] Native Women's Association of Canada. Fact Sheet: Missing and Murdered Aboriginal Women and Girls

*Note*. The content in this table is directly quoted from David's unpublished student activity sheets for *Missing*.

Table 8.2

*David's SJM Lesson-Text 2*

Four of the 12 questions from the "Understanding Using Math…" section of the student activity sheets for *Missing*:

*Question 7*:
Most of the violence occurs in urban areas rather than on-reserve (70% disappeared from urban areas versus 7% from on-reserve, the remainder being rural areas).[8] Why is knowing this distinction important in communicating the problem?

*Question 8*:
Women who have been pushed into sex trade work because of systemic racism and poverty may contribute to under-reporting of the problem of violence. Why?

*Question 9*:
A 2009 Canadian study of 10 provinces found that Aboriginal women are three times more likely to experience violent crime than non-Aboriginal women and the homicide rate for Aboriginal women is seven times more than non-Aboriginal women.[9] What are the two algebraic equations that represent this relationship, and how might knowing the relationship lead to action?

*Question 12*:
Creating women's shelters has been one way to address domestic violence. People assemble a Board of Directors, secure funding and a site, apply for insurance, and furnish the building's rooms. If the startup costs for a small shelter are $60,000 and the yearly costs (rent, food, upkeep, staff) are $40,000, fill in the following graph.

[*A blank grid and a blank table are given for students to complete*]

a. If you had $1,500,000 to run this shelter, how many years could you run it for?
b. If you had $3,500,000 to run this shelter, how many years could you run it for?

The written content from the "Make It Better…" section of the student activity sheets for *Missing*:

Download and distribute the Community Resource Guide[a] from the Native Women's Association of Canada. It is available at the following site: http://www.nwac.ca/sites/default/files/imce/2012-02-14_NWAC_CommunityResourceGuide_full_e.pdf

Take a look at the REDress Project (http://www.redressproject.org), and consider an arts-based response to what you have been learning in mathematics. What are the benefits of mathematics and art working together to do social justice?

Push the government to begin the national inquiry.

David's footnotes for the content cited in this table:

[8] Ibid. [that is, Native Women's Association of Canada. Fact Sheet: Missing and Murdered Aboriginal Women and Girls]
[9] http://www.amnesty.ca/sites/default/files/iwfa_submission_amnesty_international_february_2014_-_final.pdf

*Note.* The content in this table is directly quoted from David's unpublished student activity sheets for *Missing*.
[a] The Community Resource Guide by the Native Women's Association of Canada can be found at: https://nwac.ca/wp-content/uploads/2015/05/2012_NWAC_Community_Resource_Guide_MMAWG.pdf

Table 8.3

*David's SJM Lesson-Text 3*

Context: The content below is part of David's lesson plan for *Missing*. It specifies the Ontario curriculum expectations that the lesson would address, as well as the cultural/sociopolitical knowledge that David intended his Grade 8 math students develop before, during, and after their engagement with *Missing*.

**CURRICULUM EXPECTATION(S):**

**Mathematical processes:** problem solving, reasoning and proving, reflecting, selecting tools and strategies, connecting, representing, communicating

**Algebra:**

- represent linear growing patterns using algebraic expressions
- solve simple algebraic equations using a variety of strategies

**Data Management:**

- make and evaluate convincing arguments, based on the analysis of data
- identify bias in data collection methods

**Health-Healthy Living:**

- demonstrate the ability to apply health knowledge and living skills to make reasoned decisions and take appropriate actions relating to their personal health and well being
- demonstrate how their choices and behaviours affect both themselves and others and how factors in the world around them affect their own and others' health and well being

**CULTURAL KNOWLEDGE AND PRIOR KNOWLEDGE:**

Students have on-going discussions about:

- sexism and patriarchy – e.g. throughout the fall term in the lead up to our December 6th outreach in November
- the difference in men and women's power in Canada- for example, the historical fight for women's voting rights and the current political landscape
- domestic violence – e.g. in creating their outreach pamphlets using information from math class
- the idea of intersectionality in justice work
- Aboriginal history and colonialism, and the residential school system
- Anti-oppression work across the curriculum related to race, class, gender, sexuality, ability, [etc.] …

*Note.* The content in this table is directly quoted from David's unpublished lesson plan for *Missing*.

The first section of the student activity sheets, which is the "Setting the Stage…" section, introduces and contextualizes the MMIWG crisis through different types of information. The key analytical segments of the "Setting the Stage" section selected during the analysis of *Missing* include most of the information provided in David's unpublished student activity sheets from the beginning of the section, and they include: (1) an opening quote by a former president of the

Native Women's Association of Canada, Beverley Jacobs, about the violence that Indigenous peoples have experienced across generations in Canada; (2) data about the number of Indigenous women and girls who went missing or were murdered between 1980 and 2012; and (3) sociopolitical information related to human rights violations committed against Indigenous peoples in Canada from a historical perspective; and (4) statements that imply that VAIWG is influenced by oppressive sociopolitical realities such as socioeconomic disparity, racism, and sexism. These key analytical segments of the "Setting the Stage" section read as follows:

> We're talking about so many layers of violence, so many generations of loss, and it's all covered up in layers of silence…in order for us to move ahead, we have to deal with all the things people don't want to talk about.
>
> Beverley Jacobs
>
> (David's SJM Lesson-Text 1)

> Between 1980 and 2012 in Canada, 1,017 Indigenous women have been killed and at least 164 more are missing.[1] This has sparked 29 official inquiries that have collectively demanded more than 500 actions to resolve the problem. Now there are calls for a *national* public inquiry.[2] And the Prime Minister has recently promised to launch one.[3]
>
> (David's SJM Lesson-Text 1)

> The historical record of the treatment of First Nations peoples in Canada is rife with human rights violations: indigenous culture and religion have been banned, voting rights were non-existent until 1960, emotional, physical and sexual abuse occurred within government mandated residential schools (1800s – 1996), and laws have been made, like the Indian Act, that to this day limit and frame First Nations rights within this country.[4]
>
> (David's SJM Lesson-Text 1)

When widespread racism, poverty, sexism, misogyny, limited access to government

> services and radically different living conditions combine together, the risk of violence escalates. As Amnesty International writes: "This violence against Indigenous women and girls has deep roots in racism, marginalization and poverty."[5]
>
> (David's SJM Lesson-Text 1)

Taken as a whole, the above key analytical segments of the "Setting the Stage" section situates the MMIWG crisis within a historical and sociopolitical framework.

When students have the opportunity to think about the "Opening Question…" that follows the "Setting the Stage…" section of the student activity sheets, the historical and sociopolitical framework of *Missing* can potentially support their ability to develop an intersectional understanding of VAIWG in Canada throughout the lesson. An intersectional understanding of the MMIWG crisis is possible because the question of the "Opening Question…" section reads as follows: "Why are the historical record and the current reality of injustice *both* important to understanding the issue of missing and murdered aboriginal women and girls in Canada?" (David's SJM Lesson-Text 1). By considering the possible reasons why "the historical record and the current reality of injustice" might relate to the reality of MMIWG crisis in Canada, after reviewing the "Setting the Stage…" section, Grade 8 students may be able to critically think about how oppressive sociopolitical realities, at different points in history, may be contributing to VAIWG, presently, by the end of their engagement with David's SJM lesson.

The interrelatedness of the "Setting the Stage" section and the "Opening Question…" of the student activity sheets is reflected in David's plan to introduce the lesson by engaging students with the content of both sections of his student activity sheets. The key analytical segment of David's lesson plan for *Missing* that supports this observation is the following description of how he wanted to introduce and contextualize the lesson.

**INTRODUCTION – PART 1**

- Hand out the lesson.
- "Let's look at the title of the lesson and the quotation – what do you notice? What do you think the lesson is about?"
- Beverley Jacobs (who wrote the quotation) is the former president of the Native Women's Association of Canada and a member of the Six Nations of the Grand River Territory, Bear Clan. Why do you think her voice begins this lesson? Share with full group.
- Take student volunteers to read each paragraph from the lesson.
- "Are there any thoughts or questions about the introduction?" (Clarify terms, student(s) to re-phrase misogyny, clarify residential schools, what is an inquiry…)
- Have student read [the] "Opening Question."
- "Turn to a partner and discuss for 3 minutes the importance of linking historical injustice to current injustice."
- Full class debrief of the opening question.

(David's SJM Lesson-Text 4)

This key analytical segment of David's lesson plan indicates that he not only wanted to give students the opportunity to review the content of the "Setting the Stage…" and "Opening Question…" sections of the student activity sheets for *Missing* together, but he also wanted to facilitate students' processing of the content through dialogue. For instance, after reviewing the content of both sections, David planned to ask students to pair up and discuss "the importance of linking historical injustice to current injustice" for a few minutes, and then have them share their thoughts in a class-wide discussion. Thus, based on David's lesson plan, the class-wide review

of the first two parts of the student activity sheets for *Missing*, as well as the opportunities students would be given to discuss, and ask questions about, the related content, support the goal of facilitating students' development of an intersectional understanding of VAIWG in Canada.

Table 8.4

*David's SJM Lesson-Text 4*

Context: The content below is part of David's lesson plan for *Missing*. It indicates what David had planned to do and say in order to facilitate his Grade 8 students' engagement with *Missing* during the different stages of the lesson.

**INTRODUCTION – PART 1**

- Hand out the lesson.
- "Let's look at the title of the lesson and the quotation – what do you notice? What do you think the lesson is about?"
- Beverley Jacobs (who wrote the quotation) is the former president of the Native Women's Association of Canada and a member of the Six Nations of the Grand River Territory, Bear Clan. Why do you think her voice begins this lesson? Share with full group.
- Take student volunteers to read each paragraph from the lesson.
- "Are there any thoughts or questions about the introduction?" (Clarify terms, student(s) to re-phrase misogyny, clarify residential schools, what is an inquiry…)
- Have student read [the] "Opening Question."
- "Turn to a partner and discuss for 3 minutes the importance of linking historical injustice to current injustice."
- Full class debrief of the opening question.

**BODY – PART 2**

- With the partner you paired with, join one other partnered pair to make a group of four people. You will work together for the next 25 minutes and report back to the larger group.
- All groups will work cooperatively on the questions in the lesson and will be assigned to present specific answers at the front board – I will circulate to see which groups seem best able to present each of the questions (based on their discussions and their strategies for solving the problem, and their ability to articulate their strategies and answers).
- (Circulate, ask probing questions, take notes for debrief.)
- Report back at the front from each group – debrief both the justice content and the way in which mathematics was used to make the invisible visible.

*Note.* The content in this table is directly quoted from David's unpublished lesson plan for *Missing*.

The "Understanding Using Math…" section of David's unpublished student activity sheets for *Missing* consist of 12 questions that either contextualize, or directly relate to, people's experiences of violence in Canada. More than half of the questions in this third section directly address the disappearances and/or murders of Indigenous women and girls in Canada. The

following “Understanding Using Math…” questions were coded as four of six key analytical segments from this section, and are directly related to the MMIWG crisis.

*Question 4*: Aboriginal women are 4.3% of the female population in Canada. The total number of homicides across Canada between 1980 and 2012 was 20,313, of which 32% were female victims. If the Aboriginal women that were murdered is 1,017, what percentage is that of the total female victims and how does it compare to the percentage of Aboriginal women in Canada?

(David’s SJM Lesson-Text 1)

*Question 7*: Most of the violence occurs in urban areas rather than on-reserve (70% disappeared from urban areas versus 7% from on-reserve, the remainder being rural areas).[8] Why is knowing this distinction important in communicating the problem?

(David’s SJM Lesson-Text 2)

*Question 8*: Women who have been pushed into sex trade work because of systemic racism and poverty may contribute to under-reporting of the problem of violence. Why?

(David’s SJM Lesson-Text 2)

*Question 9*: A 2009 Canadian study of 10 provinces found that Aboriginal women are three times more likely to experience violent crime than non-Aboriginal women and the homicide rate for Aboriginal women is seven times more than non-Aboriginal women.[9] What are the two algebraic equations that represent this relationship, and how might knowing the relationship lead to action?

(David’s SJM Lesson-Text 2)

These four "Understanding Using Math…" questions reflect Social Good 1 because they open up opportunities for students to think about VAWG in an intersectional way by including information that involves two or more sociodemographic factors associated with victims of violence like ancestry/'race', sex and gender, socioeconomic income, and geographical location. All four questions address sex and gender, and ancestry/'race,' because they focus on victims of violence who are Indigenous females/women, with *Question 4* and *Question 9* inviting students to compare victimization percentages of Indigenous and non-Indigenous females/women in relation to homicides, and homicide and violent crime, respectively. *Question 7* addresses the role of Indigenous women's geographical location on their experiences of violence, and *Question 8* points to socioeconomic income as a potential factor for the under-reporting of such violence.

***Social Good 2***

*Question 4*, *Question 7*, and *Question 9* from the "Understanding Using Math…" section of the student activity sheets are examples of consciousness-raising learning opportunities in which students may experience Social Good 2—that is, students have opportunities to recognize how mathematical concepts and ways of thinking can be used to identify, and better understand, gender injustices like VAIWG. For instance, in *Question 4*, students can determine that there is an overrepresentation of Indigenous females amongst the total population of female murder victims in Canada, despite comprising a very small percentage of the total number of females in Canada. Students can come to this realization by comparing the statistical fact that "Aboriginal women are 4.3% of the female population in Canada," which is given in *Question 4*, to the computational finding that Aboriginal women represented 15.6% of the total number of females murdered in Canada "between 1980 and 2012." The 15.6% calculation by students should result from their percentage-based calculations based on: (1) the other data given in *Question 4*, which

is in the statement, “The total number of homicides across Canada between 1980 and 2012 was 20,313, of which 32% were female victims;” and (2) the question following these data, “If the Aboriginal women that were murdered is 1,017, what percentage is that of the total female victims and how does it compare to the percentage of Aboriginal women in Canada?”

Social Good 2 may also be experienced by David’s students because of how he wanted to facilitate their engagement with the “Understanding Using Math…” section during his SJM lesson. David’s goals for engaging students’ work on the questions of this section is given in the following key analytical segment of his lesson plan for *Missing*.

> **BODY – PART 2**
>
> - With the partner you paired with, join one other partnered pair to make a group of four people. You will work together for the next 25 minutes and report back to the larger group.
> - All groups will work cooperatively on the questions in the lesson and will be assigned to present specific answers at the front board – I will circulate to see which groups seem best able to present each of the questions (based on their discussions and their strategies for solving the problem, and their ability to articulate their strategies and answers).
> - (Circulate, ask probing questions, take notes for debrief.)
> - Report back at the front from each group – debrief both the justice content and the way in which mathematics was used to make the invisible visible.
>
> (David’s SJM Lesson-Text 4)

At the end of his students’ cooperative four-member group work on the “Understanding Using Math…” questions, David notes that he wanted students to “Report back at the front from each

group" about their findings to all the questions, and he wanted to facilitate a session in which his Grade 8 students could "debrief both the justice content and the way in which mathematics was used to make the invisible visible." David's use of the term "invisible" refers to the MMIWG crisis itself and the factors and realities that have contributed, and are contributing, to it.

David's plan to have his Grade 8 students explain "the way in which mathematics was used to make the invisible visible," in terms of the "justice content" related to gender and other social realities addressed in the "Understanding Using Math…" section, is connected to the third of three major educational goals he had for *Missing*. David described this third goal as follows:

> …And the third [goal of *Missing*] is [to support] the ability of students to learn the language of mathematics—to read the world. And the ["Understanding Using Math…"] questions—seeing them—there's number sense and numeration, there's algebra, there's data management in there, sort of with an overview of problem-solving. And a critical analysis of data and where it comes from, and that it's always political: how things are measured; whether they're measured; how well they're measured; who gets counted; whose voice is included [and] whose isn't. So, those kinds of questions are in the math sphere of the priority for the lesson. Maybe those are the top three [goals]. (David's Second Interview-Text 2)

David's desire to facilitate his students' abilities to "learn the language of mathematics," or to "read the world" using math, during their engagement with the "Understanding Using Math…" section of the student activity sheets, indicates that he wanted his eighth graders to understand the MMIWG crisis, and some of the factors and realities contributing to it, using mathematical concepts related to "number sense and numeration," "algebra," and "data management," as well as using mathematical ways of thinking, such as "problem-solving" processes and the ability to

do a "critical analysis" of the data presented in the student activity sheets, in order to identify and better understand VAIWG. Thus, David's third goal for *Missing* reflects Social Good 2.

***Social Good 3***

The fourth and final section of the student activity sheets for *Missing* is the "Make It Better…" section. The entire content of this section is given below.

> Download and distribute the Community Resource Guide[a] from the Native Women's Association of Canada. It is available at the following site:
>
> http://www.nwac.ca/sites/default/files/imce/2012-02-14_NWAC_CommunityResourceGuide_full_e.pdf
>
> (David's SJM Lesson-Text 2)
>
> Take a look at the REDress Project (http://www.redressproject.org), and consider an arts-based response to what you have been learning in mathematics. What are the benefits of mathematics and art working together to do social justice?
>
> (David's SJM Lesson-Text 2)
>
> Push the government to begin the national inquiry.
>
> (David's SJM Lesson-Text 2)

By completing the tasks to "Download and distribute the Community Resource Guide[a] from the Native Women's Association of Canada," and to "Take a look at the REDress Project…and consider an arts-based response to what you have been learning in mathematics," David's students could consider examples of what activist and advocacy organizations were doing, at that time, to help build a critical and social consciousness about the MMIWG crisis amongst Canadians. Moreover, in the former task, students could act to support the work of the Native Women's Association of Canada to build a critical and social consciousness regarding the MMIWG crisis, by distributing the information-rich community resource guide. David also asks his Grade 8 students to "Push the government to begin the national inquiry," which represents

one way to support the goal of building Canadians' critical and social consciousness about the MMIWG crisis. All these micro-level acts by students have the potential to help them experience Social Good 3—that is, to begin or continue to develop their sense of agency regarding gender and other social injustices associated with the MMIWG crisis in Canada.

**Relevant Knowledge Source(s) of David's SJM Lesson**

- Analytical Question 3: How are mathematics and other forms of knowledge positioned as interpretive tools through which students might better understand oppressive sociopolitical realities, including gender and other social injustices, that are informed by the purpose and/or social goods of the participant's SJM curriculum?

Grade 8 students who engage with David's SJM lesson are encouraged to build and/or utilize sociopolitical knowledge, mathematical knowledge, and experience-based knowledge in order to begin or continue to develop a critical consciousness about the MMIWG crisis. Sociopolitical knowledge is represented and needed by students in order to better understand the MMIWG crisis in each section of the student activity sheets for *Missing*. My discussion of Social Good 1, Social Good 2, and Social Good 3 supports this finding. My discussion of Social Good 2 also supports the finding that mathematical knowledge is represented and needed by learners to identify, analyze, and better understand the reality of MMIWG in Canada. Experience-based knowledge is represented and positioned as important to understanding the MMIWG crisis through the historical and sociopolitical framework of the lesson, which is showcased in the "Setting the Stage…" and "Opening Question…" sections of the student activity sheets. Moreover, the mathematical data given to, and generated by, the students during the "Understanding Using Math…" section, the sociopolitical nature of the information given throughout that third section, as well as the sociopolitical knowledge embedded in the resources

cited in the "Make It Better…" section, can support Grade 8 students' construction and use of experience-based knowledge in ways that could help them better understand the MMIWG crisis.

It is worthy to note that amongst the three aforementioned types of knowledge represented in *Missing*, mathematical knowledge is not necessarily privileged over sociopolitical and experience-based knowledge, not even in the "Understanding Using Math…" section of the student activity sheets, which makes up the majority of the content of those sheets. This is primarily because most of the "Understanding Using Math…" questions require students to use mathematical knowledge in conjunction with sociopolitical knowledge, as well as experience-based knowledge based on sociopolitical knowledge and mathematical knowledge, in order to identify and understand different aspects of the MMIWG crisis. Also, the structure of David's student activity sheets—from the "Setting the Stage…" section to the "Make It Better" section—helps to facilitate learners' inclusion of all three types of knowledge in their understanding of the MMIWG crisis. When David's lesson is considered from beginning to end, that is, holistically, the content of the student activity sheets, as well as his lesson plan for facilitating his students' engagement with that content, suggests that sociopolitical, mathematical, and experience-based knowledge can be used by students in a balanced way.

## Concluding Thoughts

The five Aspects that constitute the purpose of *Missing*, which I identified through my response to Analytical Question 1, as well as the three Social Goods that I identified during my response to Analytical Question 2, suggest that David's SJM lesson has the potential to collectively, and meaningfully, support Grade 8 students' ability to recognize, critically question, analyze, and discuss historical and sociopolitical realities that help to (re)produce VAIWG in general, and the MMIWG crisis in particular. My analysis of David's lesson plan and student

instruction sheets for *Missing*, in relation to Analytical Question 2, also indicate that the potential for students to understand VAIWG through an intersectional lens, in order to help strengthen their understanding of the MMIWG crisis in Canada, is quite strong. As highlighted during my consideration of Analytical Question 3, experience-based knowledge, mathematical knowledge, and sociopolitical knowledge are all positioned as important types of knowledge that Grade 8 students can use during their engagement with *Missing*, in order to understand gender and other social injustices that are relevant to the MMIWG crisis. This epistemological balance, in turn, can serve to support Grade 8 students' ongoing critical consciousness development about the gender injustice of VAIWG, which is central to the MMIWG crisis in Canada.

As part of my analytical method, my response to Analytical Question 4 allowed me to answer the central research question with respect to David's SJM lesson. In the Chapter 9, I contextualize and discuss my response to Analytical Question 4 in relation to *Missing.* I also conclude Chapter 9 by discussing my answer to the central research question of this study as it relates to *Missing*, which is informed by the findings associated with Analytical Questions 1 to 4.

# CHAPTER 9

# DAVID'S SJM LESSON

# FINDINGS AND DISCUSSION (PART 2)

## Key Insights Related to Relevant Discourses

In order to answer Analytical Question 4 during my analysis of David's SJM lesson, I needed to consider how certain dominant discourses present in Canada contribute to VAIWG in particular, and VAWG of any ancestral/racial background in general, in order to better understand how those discourses might limit Grade 8 students' understanding of the MMIWG crisis, as well as their ability to understand the connections between aspects of those discourses and the violence experienced by Indigenous and non-Indigenous women and girls in Canada. Using insights from empirical and analytical research studies about VAWG and VAIWG, as well as using revolutionary feminist theoretical insights about VAWG, served to enrich my response to Analytical Question 4 regarding *Missing*. I will discuss some of these insights before sharing my answer to Analytical Question 4 in relation to David's SJM lesson.

### Discourses That Can Limit a Deeper Understanding of VAWG

As has already been discussed in Chapter 2 of this dissertation, there are important connections between the influence of sexist discourses in people's lives and women's and girls' experiences of violence. It is important that young people who engage with SJM lessons about gender-based violence, such as *Missing*, become aware of such connections, as well as have consciousness-raising learning opportunities to recognize that some of these connections exist for both Indigenous and non-Indigenous women and girls. One major common connection between the problem of VAWG, and sexist discourses, that is supported by statistical and

research-based evidence, is that those who perpetrate violence against Indigenous and non-Indigenous women and girls are often males/men (e.g., Royal Canadian Mounted Police, 2015). While violence experienced by women and girls of any ancestral/racial background can be committed by any person, no matter their sex, violence perpetrated by males/men against Indigenous and non-Indigenous women and girls in Canada, and in other countries, has been documented as a systemic/structural problem that is linked to various aspects of sexist/patriarchal discourses (e.g., Baker & Stein, 2016; Canadian Femicide Observatory for Justice and Accountability, 2019; Coy, 2016; Dragiewicz & DeKeseredy, 2012; Edwards-Jauch, 2016; Kiremire, 2007; Kuokkanen, 2015; Myhill, 2015; Violence Policy Center, 2017).

Indeed, across different ethnic and national cultures, there can exist a misunderstanding of how both sexist gender identities, as well as the sexist view of power as "domination and control" (hooks, 1984, p. 83) contribute to the problem of VAWG in particular, as well as to violence by women and men against children. For instance, bell hooks (2000) points out that when American citizens have voiced their concerns about the high level of violence that exists in their country—from violence and sexual abuse against women by men to violence and abuse against children by men and women—they often fail to make the important connection between such violence and the patriarchal idea that a person in authority has the right to use force or coercion to maintain authority. Patriarchal violence, which hooks (2000) defines as violence "based on the belief that it is acceptable for a more powerful individual to control others through various forms of coercive force" (p. 61), is just one of the many negative consequences of sexist discourses. Feminist research studies have shown the value of this insight for understanding violence against women and children in families (see, for example, Namy et al., 2017).

Hooks (2000) also sheds insight into the problematic nature of "patriarchal masculinity," which she describes as a gender-related influence which reinforces to boys and men that "their sense of self and identity, their reason for being, resides in their capacity to dominate others" (p. 70). Referencing Peter Stearns' work about modern masculinity, Judy Chu, Michelle Porche, and Deborah Tolman (2005) describe a gender-related influence like that of patriarchal masculinity known as "hegemonic masculinity," which typically emphasizes "physical toughness, emotional stoicism, projected self-sufficiency, and heterosexual dominance over women" (p. 94). While males receive privilege, cultural status, and benefits to varying degrees by enacting identities, as well as engaging in forms of power, that are hierarchical and based on the domination of others (Fraser, 2007; hooks, 1984, 2000), research has shown that there are harmful costs to boy's and men's mental health and interpersonal relationships with others when they enact hegemonic masculinity (e.g., Chu et al., 2005; Tolman et al. 2003) or masculinities that involve norms like dominance and control (e.g., Wong et al., 2017).

In addition to the direct and indirect ways sexist discourses contribute to violence against women and girls in Canada, the United States, and other northern and western nations in the world, VAWG and VAIWG as structural/systemic realities can be supported by aspects of other dominant discourses, such as capitalist, neoliberal, and postfeminist discourses, when those discourses function to reinforce aspects of sexist discourses. Speaking about "Global North countries" (p. 161) in general—which include, but are not limited to, Canada and the United States—Victoria Collins and Dawn Rothe (2017) discuss examples of the ways in which sexist cultural products, like popular songs, movies geared toward young people and adults, and beauty and fashion product advertisements, serve to normalize the negative consequences of sexism such as: (1) sexist gender identity constructions; (2) sexist power relations; (3) the objectification

and sexualization of females; and (4) the view that some forms of violence against women are acceptable. Collins and Rothe describe several ways in which certain values associated with capitalist and neoliberal discourses in the commodification of sexist cultural products, as well as values associated with postfeminist discourses, function to make people complicit in reproducing: patriarchy through their everyday consumption of sexist cultural products, even if people do not consciously seek to support patriarchy and everyday sexism; and the associated gender injustices of sexism, which include various forms of violence against women and girls.

**Considering Sexist Discourses When Thinking About VAIWG**

Feminist activists and scholars have struggled to raise public and academic consciousness about high rates of violence against Indigenous women (VAIW) when such violence is perpetrated by Indigenous men. In confronting how everyday sexism *and* institutional sexism (that is, patriarchy) contribute to VAIW, such activists and scholars seek to ensure that long-lasting solutions and justice are realized for victims and survivors of violence. In particular, legal scholars Emily Snyder, Val Napoleon, and John Borrows (2015), political science and Indigenous studies scholar Rauna Kuokkanen (2012; 2015), and Indigenous feminist activist Fay Blaney (through her interview with Amanda Siebert, 2016) share insights and knowledge that speak to the importance of realizing how sexist/patriarchal discourses contribute to girls' and women's vulnerability to, and experiences of, violence within Indigenous communities. I will summarize several relevant points raised by these experts about VAIWG perpetrated by Indigenous men, as well as how aspects of sexist discourses contribute to this problem.

In their 2015 article, *Gender and Violence: Drawing on Indigenous Legal Resources*, Snyder et al. argue for the utilization of Indigenous feminist legal methodology as just one—and not necessarily the only—framework wherein Indigenous stories can be examined to help

formulate a more informed debate around solutions to present-day instances of VAIW, particularly through the application of Indigenous law. In arguing for this practice, Snyder et. al. reference and discuss insights from different writings and scholarship that highlight the reality that Indigenous histories have not been ones without sexist/patriarchal realities or VAIW. Specifically, Snyder et al. (2015) point out that:

> Indigenous histories are filled with inspiring examples and eras of significant peace, friendship, kindness, love, harmony, goodwill, and positive social experiences. Nevertheless, the past also includes significant periods and instances of hostility, aggression, cruelty, abuse, and violence, particularly against women…We contend that it is through critically constructive discussions about gender and power which resist romanticizing gender, law, and the past, that Indigenous law will be useful for thinking about today's legal challenges. (p. 598)

For these scholars, carefully considering gendered Indigenous realities of both the past and the present is important for Indigenous and non-Indigenous people to do, especially if they are to contribute to solutions that will help counter the high rates of VAIW in Canada.

Snyder et. al. (2015) highlight the ways in which sexism and patriarchy have influenced lived realities of Indigenous women within Indigenous communities/reserves through cultural, economic, and political realities. In support of this truth, Snyder et. al. (2015) raise the point that, within Indigenous cultures, there is a widely accepted "idealistic rhetoric" (p. 608) about gender-related realities amongst Indigenous people, which is reproduced in various important contexts, including academic scholarship and the media. This idealistic rhetoric focuses on the idea that gender balance occurred in a way that negated gendered power asymmetries, and other manifestations of sexism, within Indigenous cultures before European colonialism. One example

of an idealistic rhetoric concerning Indigenous gender realities is one associated with the discourse of motherhood. Through it, girls and women learn of the ideal to become not only caretakers in their families, but also caretakers (mothers) of their communities and nations. This discourse, while not taken up by all Indigenous females, is noted by Snyder et al. as being a powerful discourse that has the potential to restrict women's sense of agency, life choices, as well as economic and other forms of power. When some females conform to certain aspects this discourse of mother, it could also become a factor in their toleration of violence.

In her 2015 article entitled *Gendered violence and politics in Indigenous communities: The cases of Aboriginal people in Canada and the Sámi in Scandinavia,* Rauna Kuokkanen also elaborates on discursive (e.g., cultural) connections between sexist/patriarchal ideas of gender relations within Indigenous communities and violence against Indigenous women/females by Indigenous men/males. A major point that Kuokkanen raises in this article is that within Indigenous communities in Canada, and within Sámi communities in Norway, Finland, and Sweden, the problem of VAIW is often marginalized or ignored. In identifying reasons for this, she points to the tendency by Indigenous peoples to maintain a "silence" around VAIW that is committed by Indigenous males as a way to prioritize various cultural and political concerns, including, but not limited to, self-determination struggles and racist discrimination from non-Indigenous people which hurt Indigenous communities, in multiple ways, in all four countries.

Like Snyder et al. (2015), Kuokkanen (2015) emphasizes the importance of being cautious about thinking that colonization is the only potential reason for VAIW that is committed by some Indigenous males/men. Specifically, she states that "there is a need to reject those discourses of colonization that externalize responsibility for gendered violence or construct male violence as a reflection of their own victimhood and loss of status" (Kuokkanen, 2015, p. 273).

Moreover, Kuokkanen thinks it is vital that Indigenous peoples critically examine certain traditions, practices, and relations within Indigenous societies and cultures in Canada that are informed by both sexist/patriarchal norms, and colonial norms, because these norms contribute to VAIWG and to the silence about, tolerance of, and/or marginalization of such violence.

It is important to note that among other racialized peoples, whose historical ancestral countries of origin experienced European colonialism and imperialism, there is a tendency to overlook, or be silent about, the structural problem of violence against racialized women by racialized men of the same ancestry, as well as the ways in which sexism/patriarchy contributes to that violence when the perpetrators are racialized men of the same ancestry. Feminist scholars of African ancestry have recognized that these two realities exist amongst women and men of African heritage in the United States (e.g., Bakari, 2019; Griffin, 2013), and in African countries such as Namibia (e.g., Edwards-Jauch, 2016) and South Africa (e.g., Gqola, 2007). According to Lucy Edwards-Jauch (2016), even acknowledging that pre-colonial patriarchy in Africa existed and contributed to VAWG is contested, despite there being evidence that supports these realities.

In an interview with Amanda Siebert (2016), Fay Blaney—a founding member of the Aboriginal Women's Action Network in Canada—was one of the people who actively spoke out about the need for the MMIWG inquiry to address male-perpetrated violence against women and girls that occurs on Indigenous reserves, since such violence is one of the reasons why Indigenous women and girls leave their communities. Far from mere opinion, Blaney's claim is partly based on her professional experience of working with women who have sought help through the Downtown Eastside Women's Centre in Vancouver, British Columbia. During the time she had worked at the women's centre, Blaney met many women who moved to the lower mainland of British Columbia, and other urbanized areas, in order to leave situations of violence.

In line with Kuokkanen's (2015) insights about how VAIWG can be marginalized by Indigenous people when it is perpetrated by Indigenous men, Blaney indicates that unsupportive responses to Indigenous women's and girls' experiences of violence can be a contributing factor for their reluctance to report violence. As an example, Blaney tells Siebert that her great-aunt's reserve community members did not support her great-aunt after she had been sexually assaulted by a male perpetrator on her family's reserve, and then sought justice through the legal system. Hostility and a lack of support had caused her great-aunt to move to Vancouver's Downtown Eastside at the age of 14 in the 1950s, and she died two years later. Based on her experiences of working to help survivors of violence, Fay Blaney believes that similar Indigenous community reactions to Indigenous women's and girls' experiences of violence are still common.

In her 2012 paper about Indigenous struggles for self-determination in Canada and other countries, Kuokkanen discusses historical and research-based evidence which speak to the reality that there were, and still are, violations of Indigenous women's human rights, which, amongst other things, contribute to their experiences of structural and other forms of violence. Within the Canadian context, Kuokkanen points to the fact that provincial and federal legislations from the late 1800s have contributed to violations of Indigenous women's human rights. These laws range from the Indian Act of 1876, which supported patriarchal and colonial relations that subordinated Indigenous women's rights to Indigenous men's rights, and to the rights of other Canadians, to the passage of Bill C-3, the "Gender Equity in Indian Registration Act" in 2011. The various violations of Indigenous women's human rights have contributed to unjust cultural and political constraints which Indigenous women have had to live with, and which have left them more vulnerable to violence within Indigenous and non-Indigenous communities in Canada. The vulnerability to violence that Indigenous women and girls face because of internal

and external cultural and political constraints, is a problem that Indigenous women's groups have sought to counter and change, and is a reality that Kuokkanen (2015) believes all Indigenous self-determination activists around the world, including in Canada, need to address.

Snyder et al. (2015) also point out that the legacy of Indigenous men's political power over women within Indigenous communities has contributed to sexist economic and political realities, which have resulted in mostly male control of economic resources on reserves, as well as the underrepresentation of Indigenous women in leadership roles. In fact, sociology scholar Linda Gerber (2014) presents strong evidence that supports the concern for some Indigenous women's greater economic struggles in Canada. In connection with multiple gendered inequalities, in which asymmetrical power relations favour males/men, Snyder et al. (2015) note that, in addition to the possibility of experiencing physical and sexual violence, Indigenous women may also experience "economic violence, emotional violence, spiritual violence, and symbolic violence" (p. 602) as a consequence of not only colonialism, but also of sexism. In light of these truths, these legal scholars strongly encourage people who wish to see Indigenous law effectively address VAIW, also seek to understand the full scope of VAIW, and recognize that any interpretation and application of Indigenous law should consider how gendered realities that reflect male privilege and gendered power relations, can marginalize Indigenous women.

**Considering David's SJM Lesson in Light of Sexist and Other Discourses**

- Analytical Question 4: How might aspects and/or effects of sexist and other relevant discourses undermine the consciousness-raising potential of the participant's SJM curriculum with respect to providing students with the opportunity to better understand the: (i) influence of sexism in human lives; and (ii) connections between sexism and

oppressive gender realities, like gender injustices, that are or should be particularly relevant to the participant's SJM curriculum?

In societies in which sexist discourses continue to be pervasive in overt and subtle ways, such as in Canada and the United States, the use of violence by any person, no matter their sex and identity, as well as the enactment of certain masculinities, have been associated with the valuing of coercion, domination, and control that is informed by sexist discourses (see hooks, 2000; Johnson, 2014). Specifically, patriarchal violence, as well as patriarchal/sexist, hegemonic, and other masculinities informed by sexist discourses, continue to contribute to the ongoing problem of male perpetrated VAWG of different ancestral backgrounds, including women and girls of Indigenous ancestry, in North American, European, and African countries (see, for example, Dragiewicz & DeKeseredy, 2012; Edwards-Jauch, 2016; Kiremire, 2007; Kuokkanen, 2015; Myhill, 2015; Namy et al., 2017). As one consequence of the dominance of sexist discourses in Canada (as in other countries), the ways in which sexist discourses contribute to gender injustices that represent various forms of male perpetrated VAWG of any ancestry—including patriarchal violence done by men and the enactment of sexist masculinities by men—might not be easily recognized by Grade 8 students who engage with *Missing*.

As Collins and Rothe (2017) compellingly argue in reference to Global North countries, which include Canada and the U.S., the pervasiveness of sexist discourses, as well as other discourses of hierarchy, domination, and subordination that support sexist discourses—such as capitalist, neoliberal, and postfeminist discourses—functions to make it difficult for people, of any sex and identity, to recognize sexist ideologies, behaviours, expectations, norms, etc., as contributing factors to realities that are (re)produced by sexist/patriarchal discourses. As an application of Collins and Rothe's analysis of how other dominant discourses in Global North

countries serve to reinforce sexist discourses, I posit that these discourses help to obscure how sexism/patriarchy is contributing to the realities of male perpetrated violence against Indigenous and non-Indigenous women and girls. Moreover, the normalization of sexist discourses in Canada, the U.S., and elsewhere, as well as other discourses that reinforce aspects of sexist discourses, can make it difficult for some adolescents and adults to recognize the importance of thinking about how patriarchal violence, the enactment of sexist masculinities, and other sexist realities, should be addressed in order to significantly reduce male perpetrated VAWG of any ancestral background, for the benefit of all people. Since the MMIWG crisis, specifically, as well as the commonalities between male perpetrated VAIWG and male perpetrated VAWG of non-Indigenous ancestral backgrounds, are ongoing culturally structural social problems in Canada, the lack of learning opportunities provided to Grade 8 students during which they can make relevant connections between aspects of sexist discourses, and male perpetrated violence against Indigenous and non-Indigenous women and girls, can serve to undermine the consciousness-raising potential of David's SJM lesson for eighth graders who engage with it.

Regarding my concern about the lack of connections between aspects of sexist discourses and VAIWG in the context of the MMIWG crisis, it is important to note that, collectively, there are three critical points raised by Fay Blaney in Siebert's (2016) interview, Kuokkanen (2015), and Snyder et. al. (2015), which any SJM educator who is seeking to create transformative learning opportunities about the MMIWG crisis may want to highlight through their curricula and teaching. Firstly, sexism and patriarchy contribute, at least in part, to VAIWG that is perpetrated by Indigenous males/men. Secondly, VAIWG may be under-reported, or marginalized when it is reported, in Indigenous communities for various reasons. Thirdly, VAIWG perpetrated by Indigenous males/men is not solely a consequence of European

colonization. It can also be helpful to provide Grade 8 students with opportunities to explore a broader view of violence that Indigenous women and girls experience, and recognize, for themselves, how sexism can work to reinforce VAIWG ideologically, relationally, and practically. The fact that there is a lack of opportunities in *Missing* that could enable Grade 8 students to critically think about specific ways in which sexism contributes to various forms of VAIWG undermines the potential for this SJM lesson to strengthen their critical consciousness development about the complexities of the MMIWG crisis in Canada.

As has been discussed in Chapter 8, the findings associated with Analytical Questions 2 and 3 of my analysis of David's SJM lesson indicate how the student activity sheets for it, as well as David's own lesson plan about his facilitation of his eighth graders' learning during the lesson, help to make *Missing* a consciousness-raising curriculum through which Grade 8 students may be able to critically understand the problem of VAIWG in an intersectional way. In seeking to support his students' intersectional understanding of VAIWG and the MMIWG crisis, David problematizes racism. For instance, the "Setting the Stage…" and "Opening Question…" sections of the student activity sheets, as well as several questions in its "Understanding Using Math…" section, such as *Question 7* and *Question 8*, offer learners the opportunity to think critically about the role that racism may play in various realities related to VAIWG, including the reality that some perpetrators of VAIWG may have racist motivations. Due to the challenges Grade 8 math learners might have in recognizing, on their own, how sexism can inform VAWG in general, VAIWG specifically, and the MMIWG crisis, it would be helpful to provide them with cognitive spaces to explicitly consider how relevant aspects of sexist discourses connect to all these gender injustices. Explicitly considering the role of sexism would also complement the

learning opportunities, which are already in *Missing*, that seek to help eighth graders recognize, and critically think about, how racism may inform both VAIWG and the MMIWG crisis.

As part of the risk factors of VAIWG named in the "Setting the Stage…" section of the student activity sheets for *Missing*, David mentions sexism and misogyny:

> When widespread racism, poverty, sexism, misogyny, limited access to government services and radically different living conditions combine together, the risk of violence escalates. As Amnesty International writes: "This violence against Indigenous women and girls has deep roots in racism, marginalization and poverty."[5]

(David's SJM Lesson-Text 1)

Yet, while sexism and misogyny are mentioned as risk factors of VAIWG, and gender is positioned as a lens through which VAIWG can be understood, neither sexism nor misogyny are fully problematized throughout the lesson, which is partly due to the sex of the typical perpetrators of VAIWG not being explicitly emphasized or problematized. This is noteworthy because, in order to support Grade 8 students' critical consciousness development about VAIWG, which is at the heart of the MMIWG crisis, they would need to engage in learning opportunities that allow them to recognize connections between aspects of sexist discourses (which include misogyny) and VAIWG. In other words, Grade 8 students would need to explore learning opportunities in which sexism is problematized. One of the ways to problematize sexism in relation to the MMIWG crisis is to provide Grade 8 students with the opportunity to examine and question how, and why, various forms of VAIWG are committed by Indigenous males/men, in addition to being committed by other Indigenous and non-Indigenous people. That the cognitive spaces for students to do so are not explicitly part of the lesson plan or activity sheets for *Missing*, supports my concern that its consciousness-raising potential is limited.

## Concluding Thoughts: Revisiting the Central Research Question

- Central Research Question: When relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society?

Prepared and taught to his Grade 8 math students prior to the Canadian federal government's national inquiry into the disappearances and murders of Indigenous women and girls, which officially began on September 1, 2016 and ended on June 30, 2019, David's SJM lesson, *Missing*, sought to provide middle school students with the opportunity to better understand the ongoing MMIWG crisis, as well as some of the historical and sociopolitical factors that have allowed VAIWG to become a significant problem in Canada for decades. Through the process of answering Analytical Questions 1, 2, and 3, I found that the five aspects of the purpose of *Missing*, the three social goods of David's SJM lesson, and the ways in which mathematical knowledge, sociopolitical knowledge, and experience-based knowledge could be utilized by Grade 8 students to understand some of the oppressive gender and other social realities relevant to the MMIWG crisis in Canada, collectively serve to make the lesson a strong consciousness-raising SJM curriculum about VAIWG, which is central to the MMIWG crisis. However, when answering Analytical Question 4, I found that students' engagement with *Missing*, as a standalone lesson, might not fully support their ongoing critical consciousness development about sexism and its connections to VAIWG specifically, and VAWG in general.

Through my analysis of David's SJM curriculum that was guided by my consideration of Analytical Question 4, it became clear that although students are, in some ways, given consciousness-raising learning opportunities to understand the significance of the role of sex and

gender, and other categories of social difference, with respect to the victims of VAIWG, the sex of the perpetrators of VAIWG is not problematized to the same extent. Furthermore, sexism is not problematized through *Missing* in the same way that factors such as racism, colonialism, and poverty are, even though it is implied in the "Setting the Stage…" section of the student activity sheets that sexism and misogyny are also factors which can increase the risk of VAIWG (see David's SJM Lesson-Text 1 in Table 8.1). As noted in the discussion of my response to the fourth analytical question, sexist discourses, along with aspects of capitalist, neoliberal, and postfeminist discourses—each of which reifies aspects of sexist discourses in various ways—can contribute to the toleration and perpetration of male violence against Indigenous and non-Indigenous women and girls in Canada and other Global North countries.

Considered together, the findings associated with Analytical Questions 1, 2, 3 and 4 have led me to conclude that Grade 8 mathematics students' critical consciousness development regarding the MMIWG crisis, as well as how sexism contributes to it, may be limited during their exploration of *Missing* as a standalone lesson. However, I also conclude that the findings associated with Analytical Questions 1 to 4 collectively suggest that David's SJM lesson, in which mathematics as one set of multiple interpretive tools through which students can understand the MMIWG crisis in Canada, provides a strong foundation on which to build a SJM curriculum that could enable Grade 8 students to begin to, or continue to, develop a critical consciousness about how sexism contributes to the gender injustice of systemic violence against Indigenous women and girls. To meet this goal, intentionality could be applied to *Missing* in any number of ways. As examples only, I will discuss several recommended changes to David's SJM lesson that could strengthen its potential to facilitate the development of Grade 8 students'

critical consciousness development regarding some of the important connections between sexism and male perpetrated violence against Indigenous and non-Indigenous women and girls.

Recall that the seventh question of the student activity sheets for *Missing* reads:

> *Question 7*: Most of the violence occurs in urban areas rather than on-reserve (70% disappeared from urban areas versus 7% from on-reserve, the remainder being rural areas).[8] Why is knowing this distinction important in communicating the problem?
>
> (David's SJM Lesson-Text 2)

The statistical data in this question was taken from one of the community resource guides published by the Native Women's Association of Canada (NWAC), and represents statistics that were in the database they had created to track missing and murdered Indigenous women and girls as of March 31, 2010. In this same community resource guide, the Native Women's Association of Canada (2010) also reported that, of the Indigenous women and girls known to be murder victims, "60% were found murdered in an urban area" (p. 67). In relation to these statistics, NWAC acknowledged that resources are needed to track cases of MMIWG found in reserve and rural communities. As Fay Blaney has noted (see Siebert, 2016), VAIWG on reserves can result in Indigenous women and girls leaving their communities to live in urban areas. Grade 8 students would benefit from understanding where some Indigenous women's and girls' experiences of violence by males, or by other people they know, can begin. Thus, one revision that could be made to *Missing*, in order to better support students' critical consciousness development about VAIWG, is to add information and follow-up questions that could allow them to recognize the extent to which Indigenous women and girls on Indigenous reserves experience violence, whether or not such experiences or situations of violence have partly caused

some girls and women to leave Indigenous communities, in addition to economic and other factors. Such learning opportunities could also enable Grade 8 students to more fully understand how sexism can function to inform people's (especially males') perpetration of patriarchal violence, which negatively impacts Indigenous and non-Indigenous peoples living in any country in which sexist discourses are overtly and subtly pervasive, including Canada and the U.S.A.

The eighth question of David's unpublished student activity sheets for *Missing* reads:

> *Question 8*: Women who have been pushed into sex trade work because of systemic racism and poverty may contribute to under-reporting of the problem of violence. Why?
>
> (David's SJM Lesson-Text 2)

It is important that David had planned to create cognitive spaces for his Grade 8 students to consider why "racism and poverty may contribute to under-reporting of the problem of violence" experienced by women in the sex trade. In fact, it has been documented that amongst a variety of risk factors which contribute to non-Indigenous and Indigenous women's and girls' entry into prostitution, or vulnerability to being sex trafficked, in Canada and elsewhere, either poverty, racism, or both have been identified as two such risk factors by experts and researchers (e.g., Bryant-Davis & Tummala-Narra, 2017; Chrismas, 2017; Farley et al., 2005; Sethi, 2007; Wilson & Butler, 2014). These risk factors should not be minimized when Grade 8 math students engage with *Question 8*. However, the multiple ways in which sexism contributes to some of the reasons why women and girls, of any ancestral background, are targeted for exploitation within the various domains of sex trade (including prostitution and sex trafficking), as well as how sexism facilitates women's and girls' experiences of violence by males, are very important realities for students to critically think about, *in an age-appropriate ways*, when they consider

the possible reasons why women in the sex trade might under-report the violence they experience (see Coy, 2016; Farley et. al., 2015; Geist, 2016; Jensen, 2016; Smiley, 2016; Whisnant, 2017).

Exploiting, commodifying, violently harming, and dehumanizing women and girls in the sex trade occurs in various ways, two of which are through the: 1) purchasing women and girls to perform sex acts in various kinds of prostitution and in sex trafficking (e.g., Farley et al, 2013; Whisnant, 2017); and 2) viewing women perform sex acts in pornography, during which they are typically being dominated by males/men in some way, or are treated as the targets of violence and humiliation (see Antevska & Gavey, 2015; Bridges et al., 2010; Whisnant, 2016). With respect to pornography, research has shown that regardless of the sex of viewers of pornography, people's consumption of pornography not only validates the violence done primarily to female performers, it can also contribute to young people's and adult viewers' acceptance of VAWG (e.g., Foubert & Bridges, 2017; Stanley et. al., 2018; Ybarra et. al., 2011). These and other truths about the inherently violent and dehumanizing nature of the sex trade suggest that it would also be important to pose additional age-appropriate questions alongside *Question 8* which have the potential to allow Grade 8 math students to critically reflect on how sexism in societies serves to support the existence of such an oppressive system, and how sexism contributes to violence against Indigenous and non-Indigenous women and girls who are exploited within it.

Another change to *Missing* that has the potential to support Grade 8 students' critical consciousness about the connections between sexism and male perpetrated violence against Indigenous, and non-Indigenous, women and girls would be to provide learners with an opportunity to critically reflect on how they can personally resist sexist thinking, and sexist behaviours, that help to contribute to such violence, during the "Make It Better…" section of the student activity sheets. Creating a learning opportunity during which eighth graders can

critically think about such important connections has the potential to help them, as individuals, better recognize the pervasiveness and negative impact of sexism in their own and other people's lives. Such a consciousness-raising learning opportunity may also strengthen Grade 8 students' understanding of the role sexism plays in the ongoing reality of male perpetrated VAWG of any ancestry, in Canada and elsewhere. Students' critical reflection of the extent to which they may be internalizing sexist ideologies, identity formations, relationships, etc., is as important to their understanding of the externalized results of sexism related to the perpetration and victimization of violence, and it is vital to their revolutionary feminist consciousness development.

I share David' view that *Missing* cannot capture all of the complexity of the issues connected to its central topic, which he had articulated in the following interview excerpt:

> I find some lessons easier than others. And I would say the ones that are so complex are very difficult to capture within five pages or less [of student activity sheets for *Missing* and other lessons] or [in] 10 questions. And the idea, when talking to students, is to make sure that they understand it's just an invitation to a broader conversation. That if [a lesson] piques their interest, if it makes them think or makes them angry, it doesn't end at the end of page 5, question 10. I'm sure a lot of the lessons that are dealing with really complicated topics could be easily critiqued by people who say it just doesn't cover things to the depth and complexity that it needs to in order to do it service. And that's the danger: that you don't do it service, that you turn it into something much smaller than it actually is…You know, I'm doing another lesson on climate change and I find it's the exact same thing: there's so much that you could focus on. But within the course of a couple of lessons, which pieces will you use to keep the conversation going, really? (David's Second Interview-Text 4)

I appreciate that *Missing*, when considered as a standalone lesson, is intended to be "an invitation to a broader conversation" for students to have about the MMIWG crisis in Canada. Nonetheless, as was the case during my analyses of the other SJM curricula that were contributed to this study, I have aimed to identify how *Missing* can help students realize that VAIWG is (re)produced, at least in part, by various aspects of sexism (that is, sexist discourses), which are still being internalized, tolerated, and/or reproduced by far too many people. Revising *Missing*, or creating a SJM curriculum inspired by it, in ways that problematize sexism, has the potential to help strengthen Grade 8 students' ability to: recognize, critically question, analyze, and discuss the underlying factors rooted in sexism which contribute to the structural problem of male perpetrated VAWG of any ancestry, including Indigenous women and girls; recognize the importance of resisting and replacing sexist ideologies about their own, and any other person's sex and identity; and resist sexist interpersonal relationships, sexist approaches to power (that is, power that involves dominating and/or controlling others), and additional ways in which sexism can negatively influence their own and other people's lived experiences, since various aspects of sexist discourses can serve to normalize male perpetrated VAWG of any ancestry.

# CHAPTER 10

# CONCLUSION

## Learning From the SJM Curricula

Through this research project, the possible ways in which societal discourses might impact the consciousness-raising potential of SJM curricula regarding sexism and associated gender injustices were explored through my feminist critical discourse analysis of three specific curricula: Flannery's SJM unit, Anthony's SJM project and David's SJM lesson. As described in Chapters 4 to 9 of this dissertation, the findings that emerged in relation to each SJM curriculum were the result of my responses to four analytical questions which, collectively, helped me to answer the central research question of the study for each curriculum—that is, when relevant discourses are considered, how might the SJM curricula designed by the participants of this study potentially support the ongoing development of students' critical consciousness about sexism and associated gender injustices in their lives and society? Based on the findings, as well as the specific response to the central research question about each SJM curriculum, I have identified three major commonalities that inform the implications of the findings for SJM curriculum development and future research about SJM curriculum development.

One major commonality amongst all three SJM curricula is that, for each one, there are important connections between sexism on one hand, and the gender injustices that are explicitly or not explicitly addressed through each curriculum on the other hand. This is important because the knowledge of such connections has the potential to benefit middle school and high school math learners' personal growth, as well as support their critical consciousness development about the (re)production of sexism and associated gender injustices in their lives and society.

This commonality emerged from a review of the findings to Analytical Question 4. The second commonality amongst the SJM curricula is that, despite the types of connections between sexism and gender injustices that are relevant to each curriculum, there is either no opportunity, or a limited set of opportunities, for math students to critically reflect on how they, and others, may be negatively impacted by aspects of sexist/patriarchal discourses including sexist ideologies, gender-related expectations and norms, social practices, various interpersonal relationships, etc.

The second commonality across the SJM curricula is not insignificant because, as pervasive discourses of hierarchy, domination, and subordination, sexist/patriarchal discourses continue to be normalized within North American and other Western societies, making their influence difficult for some youth and adults to recognize, name, counter and/or resist in their personal and social lives. In addition, gender injustices (including sex-based injustices) rooted in sexism/patriarchy are also (re)produced and represented as acceptable within North American and other Western societies because of the various ways that aspects of sexist/patriarchal discourses are reinforced by: other discourses of hierarchy, domination, and subordination (e.g., capitalist discourses, colonial discourses, neoliberal discourses, and racist discourses); and aspects of other prevailing discourses that downplay and/or support aspects of sexist/patriarchal discourses (e.g., liberal feminist discourses; conservative discourses, and postfeminist discourses). The third commonality that exists amongst Flannery's, Anthony's, and David's SJM curricula is that, despite a variety of limitations, each SJM curriculum can serve as an inspirational and strong foundation for a SJM curriculum whose goals include facilitating middle school or high school math students' revolutionary feminist consciousness development.

## Implications for SJM Curriculum Development

### Intentionality Matters

The major implication associated with the findings of this study is that intentionality is important to SJM curriculum development in two ways if one of the educational goals of a SJM curriculum is to facilitate the development of middle school students', or high school students', revolutionary feminist consciousness about sexism and associated gender injustices. Firstly, a SJM educator's intentions to create consciousness-raising learning opportunities within a SJM curriculum that seeks to support middle or high school math students' efforts to critically analyze, recognize, discuss, critically reflect on, and better understand various instances of sexism, and associated gender injustices, can substantially inform the extent to which their SJM curriculum is able to facilitate the development of students' revolutionary feminist consciousness about these social problems. Indeed, the research-based evidence about sexism, and some associated gender injustices, that has been discussed and/or cited in Chapters 2, 5, 7, and 9 demonstrates the importance of engaging middle and high school math learners with SJM curricula that can explicitly support their revolutionary feminist consciousness development.

My analysis of Flannery's SJM unit, Anthony's SJM project, and David's SJM lesson—particularly during my responses to Analytical Question 4, as well as the central research question of this project in each case—indicates that it is vital for SJM educators to design learning opportunities during which math students can make connections between sexism and associated gender injustices that are relevant to their SJM curricula. For each participant's SJM curriculum, I highlighted some of the reasons why giving adolescent math students learning opportunities through which they can make such connections is important for their learning. When SJM educators apply intentionality to helping middle school or high school mathematics

learners recognize and understand the connections between sexism and associated gender injustices, they are doing the challenging, but transformative, work of creating learning opportunities through which they can develop a revolutionary feminist consciousness that can support their own choices to think, act, speak, and be human in ways that counter sexism.

Secondly, in developing SJM curricula that address sexism and associated gender injustices, a SJM educator's intentions matter with respect to their consideration of the possible ways that discourses might constrain students' recognition and understanding of sexism and associated gender injustices. My analysis of the participants' SJM curricula in this study yielded findings that speak to the importance of SJM educators' consideration of the potential impact that sexist discourses, other discourses of hierarchy, domination, and subordination, as well as other prevalent discourses that serve to support certain aspects of sexist discourses, may have on middle school or high school math students who might engage with SJM curricula which, firstly, seek to explicitly address sexism and associated gender injustices and, secondly, have the intention of supporting students' critical consciousness development about such oppressive sex and gender realities. My concern about considering the discursive influences which sexist discourses, specifically, can have on middle school or high school math students' understanding of sexism, and associated gender injustices, is supported by research studies that indicate how challenging it can be for some adolescents and adults to recognize sexism as a problem.

Matthew Diemer, Aimee Kauffman, Nathan Koenig, Emily Trahan, and Chueh-An Hsieh (2006) conducted a study that sought to understand the relationship between: (1) how urban high school adolescents in the U.S. might perceive support from family members, peers, and others to challenge sexism, racism, and social injustice; and (2) their critical consciousness development about these social problems. Among the results of this American study, Diemer et al. (2006)

found that the sample of urban youth participants self-reported that they receive the most support for challenging racism from others and the least support for challenging sexism. Within a revolutionary feminist framework, this finding from Diemer et al. is not surprising given the dominance of sexist/patriarchal discourses in North American societies.

Another research study also provides further evidence about the influence that sexist discourses can have on people's views about the problematic nature of sexism. In two experimental, multiple-phase studies, Matthew Zawadzki, Stephanie Shields, Cinnamon Danube, and Janet Swim (2014) tested the effectiveness of an experiential learning activity called the Workshop Activity for Gender Equity Simulation−Academic (WAGES−Academic) amongst undergraduate students at a university in the U.S. The intent of this activity was to reduce participants' support for sexist beliefs that can be found in STEM academic workplaces. Participants of Zawadzki et al.'s study were either in the experimental group, whose members completed a WAGES−Academic activity, or were in one of two control groups of the study.

Although they did measure for other types of sexism, Zawadzki et al. (2014) mainly focused on what is known as subtle sexism, which they describe as sexism which "involves unconsciously deployed stereotyping or bias that results in unequal and harmful treatment of women, which is not noticed or addressed because it is perceived to be customary behavior" (p. 75). The WAGES-Academic experiential activity, in general, involves individuals being randomly assigned to two small mixed-gender groups to play a game in which they can advance their careers. While players are unaware of what their teams represent in the game, one team represents women and the other represents men. The game was made with the intent that, by the end of it, the players would be able to realize the cumulative effects of gender bias associated with typical workplace issues that asymmetrically disadvantage women, like work-family

balance, salary, and workplace climate. After the game phase of the WAGES-Academic activity, players then engage in a discussion about it that is led by a facilitator. Through focused conversation, players have the opportunity to identify the connection between the teams and gender, as well as to recognize the effects of gender bias on women's advancement in a STEM field. Moreover, players can reflect on how they, other people, and institutions can challenge the gender bias that is manifested in the workplace and that may partly result from subtle sexism.

Zawadzki et al. (2014) found that undergraduate students who participated in the WAGES−Academic intervention endorsed various kinds of sexism less than those in the first and second control groups. The researchers also found that women endorsed sexist beliefs less than men for a longer period of time following their participation in the WAGES-Academic intervention. What is significant for SJM educators to note is that Zawadzki et al.'s (2014) analysis of their data showed that the WAGES-Academic intervention enabled participants to reduce their sexist beliefs because it: 1) provided other information in addition to information about sexism, gender bias, and gender inequity in STEM careers and workplaces; 2) decreased their reactance to—that is, rejection of—information related to sexism, gender bias, and gender inequity; 3) enabled them to be empathic about the negative impact of women's experiences of these problems; and 4) provided opportunities for them to develop feelings of self-efficacy based on what they learned throughout their engagement with the WAGES-Academic intervention. Overall, Zawadzki et al.'s findings and conclusions substantiate how important it can be for social justice educators in general, and SJM educators specifically, to apply intentionality during their development of curricula that intend to address sexism and associated gender injustices in a way which recognizes the potentially limiting effect that sexist discourses can have on learners' development of a revolutionary feminist consciousness about these social problems.

**Contextual Factors Matter**

A second important implication of the results of this doctoral project is that contextual factors matter with respect to whether and/or how SJM educators develop and teach SJM curricula that seek to support middle school or high school students' mathematical development, as well as their critical consciousness development about gender and other social injustices. Based on the findings of this study, two contextual factors are particularly relevant to SJM curriculum development. Firstly, the discourses that influence and inform SJM educators' worldviews may also inform the extent to which they recognize: (A) sexism and associated gender injustices as social problems; and (B) the connections between sexism and associated gender injustices. Consequently, discursive influences on SJM educators can limit, or expand, the extent to which they apply intentionality in any of the ways I have discussed above, which include whether or how they seek to create consciousness-raising learning opportunities that problematize sexism through their SJM curricula. Problematizing sexism in SJM curricula is part of the process of ensuring that students can make connections between the gender injustices about which they are learning and the role of sexism in the (re)production of those injustices.

Secondly, the extent to which creating and teaching SJM curricula is supported within a school matters to the development and teaching of SJM curricula that can facilitate middle or high school students' revolutionary feminist consciousness development. All three participants of this study noted the importance of having had the freedom to develop and teach SJM curricula as part of their teaching practice. This is not insignificant. For instance, when faced with the pressure of ensuring that they conform to curriculum programs and/or school cultures that privilege the learning of mathematics outside of SJM contexts, some SJM educators, whether or not they create their own SJM curricula, might understandably avoid teaching SJM curricula in

their classrooms (see, for example, Kwako, 2011). Consequently, institutional support for SJM curriculum development and teaching may be an important contextual factor in the classroom practice of SJM educators who want to develop and teach SJM curricula that address sexism and associated injustices, as well as other social injustices, to middle or high school math students.

## Limitations of the Study

There are three noteworthy limitations of this research study. The first limitation is that the specific components of the conceptual framework for this study uniquely contributed to the findings that resulted from my feminist critical discourse analysis of the SJM curricula, which I had operationalized through the analytical method I formulated based on Gee's (2011) method for conducting a discourse analysis. Within a different conceptual framework, my analysis of the SJM curricula might have led to different findings and conclusions if I had sought to answer the same central research question using the same analytical method. The conceptual framework for this research project is also one of the two reasons for its second limitation, which is that the findings of the study are not generalizable. The other reason for the second limitation of this study is that only three SJM curricula were analyzed. The third limitation of this study is that the SJM curricula analyzed for it were mostly intended curricula—specifically, Anthony's SJM project and David's SJM lesson. Thus, the findings could only speak to the potential of math students' critical consciousness development during their engagement with both SJM curricula.

## Implications for Future Research on SJM Curriculum Development

Based on some of the findings from this feminist CDA study, and the previously discussed implications of those results, I recommend two areas of inquiry be explored in larger-scale and multi-researcher led studies related to the development and teaching of SJM curricula by middle school SJM educators, as well as high school SJM educators, whose SJM curricula

seek to support Grades 7 to 12 math students' revolutionary feminist consciousness development about sexism and associated gender injustices. The first area of inquiry that I recommend researchers investigate, specifically through a feminist CDA study, is how sexist discourses, other discourses of hierarchy, domination, and subordination, as well as prevalent discourses that support certain aspects of sexist discourses, influence the ways in which: (1) middle school and high school SJM educators develop and teach SJM curricula that address sexism and associated gender injustices; and (2) middle school students and high school students engage with such SJM curricula. Consequently, such a feminist CDA study would need to include SJM educators and their students as participants. The results of such a research study could provide empirical and analytical evidence regarding: how discourses may influence the curriculum development choices of SJM educators; the nature of students' engagement with SJM curricula focused on sexism and associated gender injustices; and the curricular, teaching, and learning strategies that are needed to effectively support students' revolutionary feminist consciousness development.

When seeking to better understand the impact of discourses on students and SJM educators who participate in a feminist CDA study that is focused on the first area of inquiry, it would be helpful for researchers to consider the potential importance of the positionalities (e.g., social locations, worldviews, etc.) of both groups of participants. Researchers should seek to understand the extent to which the positionalities of the mathematics students impact how they engage with their SJM educator's curricula. Moreover, researchers should consider the extent to which the SJM educators' positionalities might influence the focus, content, and teaching of their SJM curricula, as well as how SJM educators' knowledge about their students' positionalities might impact the ways in which they develop and teach their SJM curricula.

As a second area of inquiry, I also recommend that researchers investigate the long-term impact of middle school and high school students' engagement with SJM curricula which address sexism and associated gender injustices, and which support both their mathematical development and revolutionary feminist consciousness development. This area of inquiry could be investigated through a longitudinal research study that is a feminist CDA study, another type of qualitative study, and/or a mixed methods study. A study that focuses on the second area of inquiry would, preferably, involve (at least some of) the students who would have participated in the feminist CDA study that investigated the first area of inquiry. Researching the long-term impact that SJM curricula which address sexism, and associated gender injustices, might have on adolescent math learners, could provide important information about the types of benefits adolescents can potentially gain as a consequence of their engagement with such curricula, and could further inform SJM educators' curriculum development and teaching strategies.

**Concluding Remarks: Supporting Journeys to Freedom From Patriarchy/Sexism**

Due to my ongoing revolutionary feminist consciousness development, which has positively informed my journey towards freedom from various aspects of patriarchal/sexist discourses, I am now more aware of the different ways in which sexist discourses can negatively impact the lived experiences of human beings—especially females who live, first, as girls, and then as women—from the violence people can experience, to the limitations placed on healthy expressions of their humanity. I am now better able to recognize the role that sexist discourses play in how people, regardless of their sex, seek to limit and control girls and women within a variety of personal and social contexts, but who may not seek to do the same with males of any subjective identity. I am better able to understand the many examples that are observable in North American and other societies in which girls and women are socially pressured to tolerate

being subordinate to males, are less protected than males, and are less supported than males—regardless of males' subjective identities—within different power relations and interpersonal relationships, as well as within private and public contexts and institutions that include, but are not limited to, peer groups, family units, religious communities, K-12 schools, post-secondary schools, political parties, sports organizations, and workplaces. I am also better able to recognize how sexist discourses undermine the humanity and health of boys, and men, as well as limit their connections to, and relationships with, themselves and others, even though sexist discourses tend to allow them to experience disproportionate levels of power and privileges compared to girls, and women, who are at the same social location as boys, and men, respectively.

Some historical evidence suggests that patriarchal/sexist discourses are older than other discourses of hierarchy, domination, and subordination, including colonial discourses and racist discourses (e.g., Lerner, 1986). An important implication of this is that patriarchal/sexist discourses can more easily function to prevent each of us, regardless of our sex, from developing revolutionary feminist consciousness about the connections between sexism and associated gender injustices, which we all should recognize and understand in order to be in a position to *choose* freedom from patriarchy/sexism, in any area of our lives, to the extent that it is possible to do so. Working towards freedom from sexism, in any of the different forms it can take in our lives and society, is worthwhile because of the empowering outcomes that can emerge in our lives and society. Such empowering outcomes include, but are not limited to: being able to recognize difficult truths about oppressive gender realities rooted in sexism; expanding our own cognitive freedom from patriarchal/sexist discourses; developing a sense of agency to counter the influence of patriarchal/sexist discourses in our lives and society in practical ways; recognizing and supporting our own dignity as human beings; developing self-acceptance, self-respect, and

self-possession; being able to understand the importance of living independently, and seeking to achieve this goal, despite constraints that are partly due to oppressive cultural, economic, and other sociopolitical realities; and increasing our ability to love ourselves and other human beings.

As the past few decades have demonstrated in Canada, the U.S., and other Global North countries, multiculturalism does not, on its own, counter some people's internalized racism, which is partly influenced by certain aspects of centuries-old colonial discourses and racist discourses. Similarly, egalitarianism, which is partly reflected through representational equality within different cultural and societal institutions and structures, will not counter, on its own, some people's internalized sexism, which is partly influenced by aspects of millennia-old patriarchal/sexist discourses. Despite the reality that egalitarianism and multiculturalism, as discourses, may inform many of our interactions within the private and public spheres of human life in Canada, the United States, and other democracies, aspects of patriarchal/sexist discourses continue to be reified and (re)produced in these societies, intentionally and unintentionally. Moreover, the normalcy of patriarchal/sexist discourses in societies is further reinforced, in part, by aspects of: other dominant discourses of hierarchy, subordination, and domination, such as capitalist, neoliberal, and racist discourses; and prevalent discourses, like liberal discourses, postfeminist discourses, and conservative discourses, which, in certain ways, can serve to support and/or draw our attention away from the influence of sexism in our lives and society.

The development of a revolutionary feminist consciousness can help us, of our own volition, choose to think, act, speak, and exist in ways that can enable us to seek freedom from the various harmful, limiting, unhealthy, and dehumanizing aspects of sexist discourses, in our private and public lives, in our online and offline experiences, in our communities and societies, and in the global community. Our seeking of such freedom, whether we are young or old, will

hopefully not only help us experience positive individual and collective transformation, but also contribute to a legacy that inspires future generations of people to do the same when they consider our individual and collective struggles to resist patriarchy/sexism. The process by which we may become more aware of, critically question, and better understand the negative influence of sexist discourses in our lives, as well as the lives of others, before deciding whether or not to make choices that can lead to freedom from patriarchy/sexism in various aspects of our own lives, is one example of what I refer to as experiencing *consciousness before choice*.

A central component of experiencing consciousness before choice is being able to know the difference between personal and social realities/truths and our perceptions of those realities/truths. Indeed, how can we respond to forms of social oppression, inequalities, and other problems that impact our lives, and the lives of others, if we do not see them clearly? Our consciousness of how we are negatively impacted by, contribute to, and/or (re)produce oppressive gender realities rooted in sexism may not, in and of itself, cause us to seek to resist and work to change how sexism (re)produces such realities. Nonetheless, I believe that our ability to choose freedom from the influence of patriarchal/sexist discourses, no matter our age, sex, and identity, is impossible without being more conscious of different oppressive gender realities that are rooted in sexism, the various aspects of patriarchal/sexist discourses and other discourses of hierarchy, domination, and subordination that inform such realities, and the aspects of other prevalent discourses that serve to support patriarchal/sexist discourses.

In light of the findings of my feminist CDA research study, as well as the discussion, interpretations, and implications of those findings, it is my hope that SJM educators who are committed to developing SJM curricula that are focused on strengthening middle school or high school students' mathematical development, as well as their critical consciousness development

regarding sexism and associated gender injustices, will begin or continue to recognize the influence that sexist discourses, and other discourses which reinforce sexism, can have on adolescent students' understanding of oppressive sex and gender realities. It is my contention that if SJM educators design and/or teach SJM curricula that create learning opportunities which seek to facilitate the development of students' revolutionary feminist consciousness, then those learning experiences can truly benefit adolescents well beyond their school-based engagement with them. This is especially possible if adolescents engage with different SJM curricula that seek to help them develop the capacity to experience the positive, long-term, and empowering outcomes which can result from developing a revolutionary feminist consciousness. In addition to several empowering outcomes I mentioned earlier—including the development of self-acceptance and self-possession—such SJM curricula can potentially contribute to other empowering outcomes that could enrich adolescents' growth as human beings, including understanding the importance of co-building all kinds of interpersonal relationships based on love, power-sharing values, respect for their own and other people's right to live with dignity and in safety, respect for their own and other people's right to be independent, and respect for their own and other people's right to choose to be free from patriarchy/sexism as much as possible.

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# APPENDIX A

# QUESTIONS OF THE INTERVIEW PROTOCOLS

## Introductory Interview Protocol Questions

While a few other questions were posed to different participants during our introductory interview(s), the following questions were posed to all participants and the answers to these questions provided the basis for the interview-based key analytical segments of their SJM texts.

1. Could you please briefly discuss some of the major factors or experiences that ignited your interest in developing and teaching *social justice mathematics* (SJM) curricula?

2. What are your views about the role that mathematics, as an interpretive tool, might play in helping students develop a critical consciousness about sexism and/or associated gender injustices through their engagement with SJM curricula in general?

3. How pervasive do you think sexism is in your society? Why?

4. How do you view the relationship between gender injustices *and* various forms of sexism that can influence, or be reproduced by, any person, which include, but are not limited to, sexist ideologies, sexist social practices and sexist social relations?

5. What are the main topics and educational goals (including mathematical goals and social justice goals) of the SJM curriculum you have chosen to contribute to this research study for analysis?

6. What aspects of your SJM curriculum might help students develop the kind of critical consciousness needed to understand *and* challenge sexist ideologies, social practices, and social relations that they may experience or reproduce in their lives, in society, and through their views of themselves and others?

7. Would you like to share any other thoughts or views about your SJM curriculum or comment further on any of the issues you discussed throughout this interview?

## Member-Checking Interview Protocol Questions

Adaptations of the following questions were posed to all participants during our member-checking interviews.

1) How well do you think I understood and represented your SJM curriculum in the report I sent you which described some of the findings related to my analysis of it?

2) What points stood out to you when you reviewed the report, and why? Please note that the points can be about: what surprised you; what you found interesting; what you connected with the most or the least; what you agree or disagree with; etc.

3) What do you think about the role that gender-related and other discourses in society might play in how students might engage with, and respond to, the SJM curriculum you contributed to this study?

4) Have any of the findings and/or issues discussed in the report given you insights or ideas that might influence: how you teach the SJM curriculum you have contributed to the study in the future; your choices regarding the content of the SJM curricula you may develop in the future; and/or how you develop SJM curricula in the future?

5) Do you have any additional thoughts or comments that you would like to share with me?

## APPENDIX B

## INTERVIEW-BASED DATA TABLES ASSOCIATED WITH FLANNERY

Table B1

*Flannery's Interview-Text 1*

Context: The following introductory interview excerpt includes Flannery's (FD's) response to a question posed by Gerrenne (GG) about the main topics and educational goals of her SJM unit on percent change.

GG: Although you did, you know, talk about the percent change unit in your [published chapter essay], I just wondered if you can discuss the main topics and educational goals of that unit, which you've chosen to contribute to this research study.

----------[TEXT]----------

FD: I wanted [my] kids to know how to do the [percent change] calculation...So, a really critical part of the math is that percent change is based on what the starting point is....Like if you were just to say, 'Oh, women started with three seats [in the Senate] and now they have seven,' you know, that's, like, we gained four seats or more than twice as many. [However,] if you look at the percent change, you're, like, 'Ahhh, it's 133% change,' [and] it sounds gigantic, right? It sounds like the whole world has shifted and been overhauled; meanwhile, it's still not very many [out] of a hundred seats. So, I think my anchoring the math learning in context allows [students] to [consider]: what are the limitations of this sort of descriptor, and what are the strengths of it?....So, the homework assignment I gave [my Grade 8 students during the Fall of the 2010 to 2011 school year] was to, like, ask a question about the data that I had provided them with and answer it. Some [students] were really curious or angry or emotional about looking at the demographic shifts in the Congress…[Some of the students] weren't actually all that personally curious about it. So, the unit became so much richer [during Spring] when I said [to my Grade 7 students], "it is now your job to think about what do you want to know in the world?" and for them to go out and ask their own questions. For many of the students that was an environmental or social justice issue…One girl asked, like, "what [is] the percent change in the number of crayon colors available in Crayola?" Right? Like, that's a great question. She's learning math. She's, like, asking her own question, finding the data. In the end, when there were 20 kids sharing their work, she's getting to hear about all the social and environmental justice investigations that [were done by her classmates] and that's all right….So a big unit goal is [that the students] connect back to their own curiosity [and] recognize the math [they are learning] as a tool for answering their own questions.

*Note.* The content of this table is taken from Gerrenne's transcript of her introductory interview with Flannery.

Table B2

*Flannery's Interview-Text 2*

Context: The following introductory interview excerpts are responses from Flannery (FD) to a question posed by Gerrenne (GG) about her views on the pervasiveness of sexism in American society. Flannery shared two examples—one from her own life and another about gender disparities in Congress over the course of her lifetime—before sharing an overarching view about sexism in the United States.

GG: How pervasive do you think sexism is in American society right now? And why?

----------[TEXT]----------

FD: When I was in middle school…it was a pretty regular experience of my middle school life that the teachers would say, "that's pretty good for a girl."

GG: Oh, wow.

FD: Because I was really into math, I was really into science…I loved shop classes, I loved to build things and tinker with things, but it was just, like, a pretty male-dominated world. And that was the '90s! That is not, like, back in the '50s, right?...Even if I produced the best project in the whole class, instead of [the shop teachers] saying [to me] "that's amazing, way to go, your hard work paid off," the feedback I would get from [them] was "pretty good for a girl." And that to me is crazy.

GG: Yeah. ((*FD laughs a bit*))

FD: The lesson that I published in *Rethinking Mathematics* is a lesson that I developed…I was just rethinking a part of my curriculum and when I went and did the research, I just looked at the numbers. To find out that there were only three women in the Senate when I was born, like, it totally messed with my mind…Even now [in 2014] there aren't that many women senators.

----------[TEXT]----------

FD: I do feel like there's been a lot of progress around what women can do and what women are encouraged to do...So, I think we live in a less sexist world than even the world that I grew up in, but I think that there's still a lot of gender divide...I think the opportunities are there, but the expectation is not always there.

*Note.* The content of this table is taken from Gerrenne's transcript of her introductory interview with Flannery.

Table B3

*Flannery's Interview-Text 3*

Context: The following introductory interview excerpt is part of Flannery's (FD's) response to a question posed by Gerrenne (GG) about her views on the relationship between gender injustices and sexism.

GG: How do you view the relationship between gender injustices—including gender inequities, which I think are examples of gender injustices—and various forms of sexism such as sexist ideologies, practices, expectations, relations, etc.?

FD: I'm not really sure that that's something that I think about.

GG: Okay.

FD: Like I would say…gender injustices have to be corrected if you want the system to change, if you want to move to a place where there is greater gender balance….I don't think too much about how gender injustices and sexism—I'm not so worried about how they interact...[We need to move] towards a place where women feel empowered to do everything and everyone expects them to be doing whatever they're capable of. The important work along that path is to highlight the places where there are inequities, and to highlight moments where people are getting away with [injustices] based on gender—like if [injustices] are happening because of gender….And it's not that all the gender inequities just come from men...[They're] also perpetuated by women...We have to hold all of us accountable….When you hold people accountable for things that are unjust, you're helping to move us forward on the timeline...We know about the women who've stood up for [other women] in the past. Not all of them, but we know about some of them, right?...Life for us [as girls and women] looks really different from [the lives] of people a hundred years ago in terms of what's possible, and what's, like, fairly commonplace. I think there's still a lot of work to be done—there's a lot of movement to happen—but as we continue to hold people accountable, we're forging a path that's more just.

*Note.* The content of this table is taken from Gerrenne's transcript of her introductory interview with Flannery.

Table B4

*Flannery's Interview-Text 4*

Context: In the following interview excerpt, Flannery (FD) responds to a question posed by Gerrenne (GG) about the potential for students to develop a critical consciousness regarding sexism when they have the opportunity to engage with her SJM unit on percent change.

| | |
|---|---|
| GG: | You know, part of this unit sort of addressed, or gave students a space to think about, gender inequities…What aspects of this lesson do you think could enable students—whether they're your own students or other students— to gain a critical consciousness about sexism? |
| FD: | So... For me, it's really important that the lesson is not, like, the only conversation that a kid ever has, right? And I have all these colleagues that my kids get to work with before they get to me [and experience mathematical learning] opportunities to develop a critical consciousness [and] to think about sexism...Simultaneously, while I'm teaching that [percent change unit] in math, they're having really important conversations in their literature and history classes....Developing the ability to ask questions is something that's happening all over the place...A really great thing about it happening during this math unit is that it allows kids to remember that [asking critical questions is] not, like, compartmentalized to when you're studying debate, or it's not compartmentalized to when you're studying feminist history for that moment in time...We're always going to be question-askers, and we're always thinking about, like, gender equity, we're always thinking about racial justice. |
| GG: | Yeah. |

*Note.* The content of this table is taken from Gerrenne's transcript of her introductory interview with Flannery.

## APPENDIX C

## INTERVIEW-BASED DATA TABLES ASSOCIATED WITH ANTHONY

Table C1

*Anthony's Second Interview-Text 1*

Context: The following interview excerpt includes Anthony's (AP's) response to a question posed by Gerrenne (GG) about the major topics and educational goals of his SJM project. Specifically, Anthony had spoken about the topic, structure, and social justice oriented goals of his SJM project.

| | |
|---|---|
| GG: | What are the major topics and educational goals of the SJM project you have chosen to contribute to this research study for analysis? |
| AP: | Okay. So, the big topic is gender equity—that's the umbrella topic—but underneath that students will choose their own version of that. |
| GG: | Yes. |
| AP: | So, I've asked [students]—and I did it myself, I did a Twitter search on gender equity—and I asked them to read at least 40 different tweets, which sounds like a lot but, like, a tweet is so short. But I said for every side article that they open or review they can review five fewer tweets, so that will hopefully motivate [students] to review [relevant topics in] a little bit more depth. So, hopefully from that, they'll come up with some possible topics under the umbrella of gender equity. |
| GG: | Okay. |
| AP: | And I've left it completely open to students so that, ideally, what would happen in the situation is they might take a week to do the research on it but, at the end, they'll come back and they'll share with each other what they've found. So, [after] an hour in a class with 25 students, you've got 25 different topics all under the umbrella of gender equity. Then [in their small groups] they can explore [one topic] together in more depth. |

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with Anthony.

Table C2

*Anthony's Second Interview-Text 2*

Context: In the following interview excerpt, Anthony (AP) shared a few reasons for the open-ended nature of his SJM project, when prompted by Gerrenne (GG).

| | |
|---|---|
| GG: | I just wanted to know if you wanted to comment just a little bit on why it was important for you to ensure that the project itself was open. |
| AP: | Well, I think one of the things that is a problem with the way that math is often taught is that students don't find it accessible to themselves. And student engagement is much higher if a student has chosen a topic themselves. That's why I want to make sure that it's open. I don't want to force [students] to explore something that they don't want to learn about. If they've chosen the topic, they care about the topic, then that emotion that they attach to it will help them learn the math that's necessary. |

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with Anthony.

Table C3

*Anthony's Second Interview-Text 3*

Context: In the following interview excerpt, when prompted by Gerrenne (GG), Anthony (AP) described a few mathematical concepts and goals that would be central to his SJM project, as well as the most appropriate high school math course and level in which it could be taught.

| | |
|---|---|
| GG: | [What kind of course] is this meant for within the Ontario curriculum?...What kind of math topics—concepts—would [students] need, do you think, to, sort of, pursue this project? |
| AP: | So, I think, because it's a research project, it's largely going to be things like data management and proportional reasoning. |
| GG: | Okay. |
| AP: | So, [these mathematical concepts] fall into any number of courses. I'm thinking Grade 9 applied math would be, probably, a good choice for it because [students] are largely unmotivated to do math at that point, and this makes it very authentic and realistic for them. So, I could visualize it there. I could visualize it in a vocational stream; really, any Grade 9 to 12 vocational [math course]…You could probably fit [this project] into a [Grade 7 or 8 math class] as well. So, let's talk about Grade 9 applied math because I think that's probably where it would have the most application across [the] Ontario [mathematics curriculum]. |
| GG: | Sure. |
| AP: | So, if you were to do this as a data management [project], there is the whole data management stream in there. So, you could do an analysis of, say, a week's worth of tweets, collect all those tweets, [and ask] how many of them apply to whatever particular question you've got, like sexism in sports or whatever it happens to be. So, how many tweets are in favour of this? How many tweets are in favour of [that]? You could do it as a survey? You could do that sort of thing pretty easily. It doesn't have to be stuck on Twitter either. [It's] just [that what students find on] Twitter is the basis for their idea [of their group's topic]. |
| GG: | Yes. |
| AP: | So, they could create their own survey and talk about biased and unbiased questions, and then deliver that to their peers. That sort of thing. |
| GG: | Yes. |
| AP: | As far as proportional reasoning is concerned, again, when they do the data analysis of such a survey, they could come up with their own proportional reasoning questions in terms of "How might this apply across Peel?" [or] "How might this apply across Ontario compared to other countries?" Like, that sort of thing. And you would use proportional reasoning to answer those questions. |
| GG: | Okay. Great. Thanks. |
| AP: | No problem. |

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with Anthony.

Table C4

*Anthony's Second Interview-Text 4*

Context: In the following interview excerpt, Anthony (AP) responds to a question posed by Gerrenne (GG) about his views regarding the relationship between sexism and gender injustices.

| | |
|---|---|
| GG: | So, how do you view the relationship between gender injustices…and various forms of sexism, such as sexist ideologies, sexist social practices and sexist social relations? |
| AP: | So, how do I view those? |
| GG: | Yeah, the relationship between gender injustices and, basically, different forms of sexism—such as [sexist] ideologies, relations, etc. |
| AP: | Oh, yeah, yeah, yeah. I think they go hand in hand. You see societal injustice, and that plays out in many different ways. Sexist [in] both ways. Yeah, I'm not sure that I could mentally separate them. |
| GG: | Okay. Can you give an example of how you see them relating? |
| AP: | Okay. So, um... I mean, let's talk [about] sports. |
| GG: | Okay. |
| AP: | There's a female hockey player who's playing for a potential NHL team—like, it's one of the farm teams for the NHL—and the comments around her are way more negative. The team is very supportive of her, but the fans aren't, and fans from other teams aren't. |
| GG: | Okay. |
| AP: | And it's not… Like, she hasn't played a game yet. |
| GG: | Right. |
| AP: | As a goaltender, as well, you don't need to be six feet, five inches, and you don't need to be 400 pounds. All you need to be is someone capable of stopping the puck with quick reflexes and flexibility. A goaltender's the perfect position for someone that, maybe, isn't a big bruiser of a person. |
| GG: | Yes. |
| AP: | There are small players in the NHL, but you don't hear those things about them. |
| GG: | Yeah, yeah. |
| AP: | But because she's female, you do. So, that instant injustice sits there. And that translates, as well, to small men who want to play in the NHL—that they can't be as good because they're smaller. |
| GG: | Right, right. |
| AP: | So, I mean [sexism and gender injustices are] connected directly, to me. |

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with Anthony.

Table C5

*Anthony's Second Interview-Text 5*

Context: The following interview excerpt includes Anthony's (AP's) response to Gerrenne's (GG's) question about the potential for students to develop a critical consciousness about sexism and gender injustices through their engagement with his SJM project.

GG: What aspects of your SJM project might help students develop the kind of critical consciousness needed to understand and challenge sexist ideologies, practices and relations that they may experience or reproduce in their own lives, in society, and through their constructions of themselves and others?

AP: I think one of the things that being on Twitter does for them is that it opens up all levels of society. So, they'll see comments that are inappropriate to see in a classroom, but because they're doing it as live research, they'll see things that are reality for them. So, hopefully that will open their eyes to injustice and societal beliefs that are beyond, maybe, what they have [seen or experienced] themselves.

GG: Okay.

AP: So, that's one thing: that it will open their eyes to potential injustice. Another thing that's in place with this [project] is that [when] they do share [their findings] together, they're not just learning about one aspect of gender equity or gender equality, they'll learn about twenty different topics within there. And then [the class] can come up with themes together.

GG: Okay.

AP: [Students might see that] there are a lot of similarities, a lot of overlap, and by each [student exploring] a different topic or aspect of gender equality or gender equity [as individuals, as members of their small groups and as learners of the inquiries made by other groups], they'll be able to get [a fuller] view.

GG: Okay.

AP: So, the idea that they're looking at society through a societal lens [such as] social media—and that they're also exploring multiple topics—I'm hoping that it would give them a better view.

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with Anthony.

## APPENDIX D

## INTERVIEW-BASED DATA TABLES ASSOCIATED WITH DAVID

Table D1

*David's First Interview-Text 1*

Context: The following interview excerpt includes some of thoughts David (DS) had shared about the importance of addressing sexism, patriarchy, and associated gender injustices through mathematics curricula in general. David's comments are in response to a question about this topic posed by Gerrenne (GG).

GG: So, what do you think about the importance of addressing sexism, patriarchy—which is basically institutionalized sexism or normalized sexism—and associated gender injustices through math curricula in general?

----------[~Text~]----------

DS: I think, across the board, it's possible to address sexism and patriarchy, as well as, like, anti-oppression work in general. Like, the whole spread of anti-oppression topics [can be] address through mathematics because you have all sorts of economic indicators.

GG: Sure.

DS: Right? And trends. We were looking on the computer today at the difference between linear growth and exponential growth. [There are] all sorts of political indicators and studies that you can look at that specifically relate to sexism and patriarchy locally, nationally, and globally. You can look at access to social resources, well-being indices like the Gini index, as well. So, you can capture, or try to capture, trends and patterns [about] what's happening, specifically, with regards to patriarchy and sexism. But then you can also look at the impact, again, of all sorts of violence.

GG: Sure.

*Note.* The content of this table is from Gerrenne's transcript of her first introductory interview with David.

Table D2

*David's First Interview-Text 2*

Context: In the following interview excerpt, David (DS) articulated additional views about how mathematics can shed insight into sexism and patriarchy for students. David's comments here were also in response to the question Gerrenne's (GG) posed to him that is quoted in Table D1.

| | |
|---|---|
| DS: | I think [mathematics is] a different way to look at the problem; it complements all the other fields. |
| GG: | Okay. |
| DS: | Right? So, you can have stories and narrative in the language classroom about sexism and patriarchy, and together with the analysis that happens in a math classroom you can quantify a bigger picture and that's where I think the math comes into it. |
| GG: | Sure. |
| DS: | And, you know, when you're asking, 'through mathematics curriculum, when can you do that?' oftentimes, in order to change things, I think it's important to be able to measure things. |
| GG: | Okay. |
| DS: | And often things are measured very poorly. ((*DS laughs a bit*)). And the data that you get can lead you on the wrong track, for sure. |
| GG: | Yeah. |
| DS: | But at least you can think about. How do we measure things? And, which things do we measure? Which things are priorities and which are not? |
| GG: | Right. |
| DS: | And then, where do we move to? |
| GG: | Mm. |

*Note.* The content of this table is from Gerrenne's transcript of her first introductory interview with David.

Table D3

*David's Second Interview-Text 1*

Context: In the following interview excerpt, David (DS) articulated his views about middle school students' capability to develop critical thinking skills about gender-based violence, and act in transformational ways with respect to this gender injustice as a result of engaging with this social problem through SJM curricula. David's comments were part of his response to a question posed by Gerrenne (GG) about how he thought *Missing* might help students develop a critical consciousness concerning sexist ideologies, practices, and relations.

GG: What aspects of your lesson might help students develop the kind of critical consciousness needed to understand and challenge sexist ideologies, practices and relations—social relations—that they may experience or reproduce in their lives, in society, and/or through their views of themselves and others?

DS: So, I would say first that by entering the content of it onto the floor so that [students] can talk about [the issues addressed in *Missing*]. I think you need the content first because [learners] haven't necessarily—or very much—talked about some of these issues. So, when you're working with students, [it's good to help] them see [the content of the] story first, and that can then be used to read that content critically, and [I can] teach the skills to read that content critically, and those skills can be used more broadly. Those are take-away skills where [students] can use those critical thinking skills in their own lives to make decisions about their own, for example, interactions with others and their own personal safety, [and] understanding their own rights. For example, consent as it relates to, like, sexual activity.

GG: Mm-Hm.

DS: And being able to see things that are a problem and stand up for others. Rather than being passive bystanders, [students] can be allies and then to be able to join in broader coalitions of people fighting to change, for example, [violence against Indigenous and Non-Indigenous women]. I think [building coalitions for social change] applies broadly. And I think that the beauty of bringing [gender injustices] into the mathematics classroom is that people sometimes can dismiss narrative in a way that they don't when they are faced with the math behind it, whether that's just simple statistics or the relationships between things in patterning and algebra. [Math] brings a new piece. And that's what we hear when the students go out to talk about domestic violence in Canada: that people say they're really impressed that young people are able to talk with eloquence about the problem, really frame it numerically, as well as within a narrative.

GG: Right.

DS: So, I think that when they can take it and own it and use those critical thinking skills to apply them to their own personal lives, that's the goal, for me anyways.

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with David.

Table D4

*David's Second Interview-Text 2*

Context: In the following excerpt, David (DS) discussed some intended social justice and mathematical goals of *Missing*. David's comments were part of his response to a question Gerrenne (GG) posed about such goals.

GG: What are the major mathematical goals and social justice oriented goals and/or concerns of the SJM lesson you have chosen to contribute to this research study for analysis entitled *Missing*?

----------[~Text~]----------

DS: I would say, first and foremost, the idea behind the lesson is to introduce students to the idea of missing and murdered Aboriginal women in Canada.

GG: Right.

DS: Some of the historical roots are: the residential school system; the Sixties Scoop; and, further back, ideas about colonialism and what happens to indigenous populations when you have a colonialist power coming in—or powers.

GG: Right.

DS: I say introduction because that's five PhDs worth of work. ((*DS laughs a bit*))

GG: Sure. ((*GG laughs a bit*))

DS: But, uh, if you're not having the conversation in Grades 7 and 8, then there's a problem. And probably [in] much earlier [grade levels]. I think it ties nicely into the Grade 7 and 8 history curriculum. It's not in my portfolio, but the mathematics behind it can help that conversation along. So, that's the first priority: just to introduce the content material.

GG: Sure.

DS: The second [goal of *Missing*] would be to introduce or maintain a focus on the intersectionality of this particular issue. So, you're dealing with race and class and gender and colonialism. I think it's a rich subject [about which students can] look at intersectionality.

GG: Yeah.

DS: So, that was the second priority for the lesson. And the third [goal of *Missing*] is [to support] the ability of students to learn the language of mathematics—to read the world. And the ["Understanding Using Math…"] questions—seeing them—there's number sense and numeration, there's algebra, there's data management in there, sort of with an overview of problem-solving. And a critical analysis of data and where it comes from, and that it's always political: how things are measured; whether they're measured; how well they're measured; who gets counted; whose voice is included [and] whose isn't. So, those kinds of questions are in the math sphere of the priority for the lesson. Maybe those are the top three [goals].

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with David.

Table D5

*David's Second Interview-Text 3*

Context: In the following excerpt, David (DS) shared additional insights about the educational goals of his SJM lesson *Missing* in the context of a school-wide event, and as part of his SJM curricula about gender-based violence. David's comments were part of his response to a question posed by Gerrenne (GG) about the current and/or historical social realities that influenced his interest in addressing sexism and gender injustices through *Missing*.

GG: All right. Um. Okay. So, the next question is: what specific current and/or historical social realities—of which you have already named a few—influenced you to address, in particular, sexism and associated gender injustices, as well as other relevant forms of social oppression and injustice, through this particular lesson?

DS: So, I mean, there's a growing body of evidence and calls for action on this particular topic coming from Indigenous communities and associations like the Native Women's Association of Canada. You know, if you look at their data, it's saying there [have been] 600 in the past twenty years—600 missing or murdered [Aboriginal women]—but then, if you look at the RCMP report, which is also very current, they're looking at over 1200 missing and murdered Aboriginal women. The ongoing current call for national public inquiry is in the news. There's lots [of people] advocating for it. So, it's very current.

GG: Yeah.

DS: And that has a momentum for this lesson because it paints such a bleak picture of violence against women that it fits nicely into [our school-wide] curriculum and focus because—I think I mentioned [it to you] before—[students] spend the Fall looking at gender as a construct in the run up to the December 6th outreach that we're doing at the end of November on the International Day to end [i.e., for the Elimination of] Violence Against Women.

GG: Right.

DS: And so all of it is supposed to flow together in all the different classrooms towards the outreach and the action: talking to people on the streets; and being able to articulate [not only] the problem of domestic violence, but also men's power vis-à-vis women's power in Canada. And I guess this is just another piece of that intersectionality of it because if you add in [Aboriginal people's experience] then you can see it's very different than if you just talk generally about violence against women. That there are particular barriers and systemic oppression that make the problem much worse.

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with David.

Table D6

*David's Second Interview-Text 4*

Context: In the following excerpt, David (DS) articulated his views about the limits and possibilities of SJM curricula for middle school students. David's comments were part of his response to an invitation to share his final thoughts about *Missing*, which was prompted by Gerrenne (GG).

GG: Do you have any other final thoughts or more comments? Or something that you just wanted to talk about with regards to your lesson that you think I should remember before I do my analysis? ((*GG laughs a bit*))

DS: I find some lessons easier than others. And I would say the ones that are so complex are very difficult to capture within five pages or less [of student activity sheets for *Missing* and other lessons] or [in] 10 questions. And the idea, when talking to students, is to make sure that they understand it's just an invitation to a broader conversation. That if [a lesson] piques their interest, if it makes them think or makes them angry, it doesn't end at the end of page 5, question 10.

GG: Right.

DS: I'm sure a lot of the lessons that are dealing with really complicated topics could be easily critiqued by people who say it just doesn't cover things to the depth and complexity that it needs to in order to do it service. ((*DS laughs a bit*)) And that's the danger: that you don't do it service, that you turn it into something much smaller than it actually is…You know, I'm doing another lesson on climate change and I find it's the exact same thing: there's so much that you could focus on. But within the course of a couple of lessons, which pieces will you use to keep the conversation going, really?

GG: Right. Right. Okay.

DS: Yeah.

*Note.* The content of this table is from Gerrenne's transcript of her second introductory interview with David.