

PRODUCTS OF WHITE INSTITUTIONAL SPACE: AN ANALYSIS OF WHITENESS IN ONLINE MATHEMATICS TASKS

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Research has shown that mathematics education is a white institutional space. Utilizing two frameworks, I interrogate an online mathematics curriculum for tenets of neutrality, impartiality, and color blindness. While several themes emerged from this analysis, for the sake of this paper, I highlight three themes: mathematics is portrayed as neutral, real-world scenarios are readily manipulated with data, and lack of cultural sensitivity. There is a value in dismantling mathematics education as a white institutional space because it broadens the opportunities for students to engage with mathematics in more authentic ways. I encourage other scholars to join in interrogating whiteness in mathematics education.

Keywords: Curriculum Analysis, Equity and Diversity, Teaching Tools and Resources

Purpose of the Study

In recent years, scholars have started to problematize how we research, teach, and learn mathematics to dismantle systems, pedagogies, and practices that privilege whiteness while oppressing minoritized students. Using Martin's (2013) framework of mathematics as a white institutional space, I analyze six lessons from the *Mathalicious*¹ curriculum to examine the extent to which the curriculum perpetuates white institutional spaces. Martin (2013) argues that mathematics education and its products (e.g., curricular materials) operate as a white institutional space that produce racial/ethnic educational inequities. White institutional spaces are characterized by

(1) The numerical domination by whites and the exclusion of people of color from positions of power in institutional contexts, (2) the development of a White frame that organizes the logic of the institution or discipline (3) the historical construction of curricular models based upon the thinking of white elites, and (4) the assertion of knowledge production as neutral and impartial, unconnected to power relations," (Martin, 2013, p. 323).

As such, mathematical curricula are not neutral and often have connections to politics and inequities (Lesser and Blake, 2006).

While mathematics is often conceptualized as universal, culture-free, and based on a system of meritocracy, anthropologists have shown that mathematics is a product of the social, cultural, and economic needs, values, and norms of societies and cultures (Powell and Frankenstein, 1997). Simply put, mathematics is not neutral or objective (Battey, 2013; Gutierrez, 2013; Bishop, 1994). The research questions elucidated in this paper are the following: 1) Does *Mathalicious*, treat mathematical knowledge as neutral and impartial, if so, how do we identify neutrality and impartiality? And 2) do mathematics tasks or lessons, such as *Mathalicious*, discuss societal phenomena unconnected from power relations, if so, how do we identify this discontinuity?

Theoretical Frameworks

For this study, I integrate two complementary theoretical frameworks: Martin's (2013) work on mathematics education as a white institutional space and Battey and Leyva's (2016), framework for understanding whiteness in mathematics education. Divided into three dimensions, Battey and Leyva's (2016) framework serves as a lens that functions to, "(a) systematically document how

¹ www.Mathalicious.com

whiteness subjugates historically marginalized students of color and their agency in resisting this oppression, and (b) make visible the ways in which whiteness impacts White students to reproduce racial privilege," (Battey & Levya, 2016, p. 49). The dimensions of whiteness (institutional, labor, and identity) are divided into corresponding elements. The elements encompassed in institutional whiteness are ideological discourses, history, organizational logic, and physical space. The labor dimension includes cognition, emotion, and behavior. The final dimension, identity, encompasses academic (de)legitimization, co-construction of meaning, and agency and resistance.

Methodology

I choose to investigate *Mathalicious* because the mathematics lessons integrate Common Core State Standards (CCSS) and Standards for Mathematical Practices (SMP) as its foundation and use real-world contexts to help students build conceptual understanding in mathematics. Several prominent researchers frame mathematics education as an example of white institutional spaces due to the historical construction of curricular models based upon the thinking of white elites. CCSS serves as a racial project in that it "presents itself as a colorblind and universal effort with equity and social justice ends" (Martin, 2013, p. 326). Moreover, CCSS serves as a product of white institutional spaces, because the curriculum encourages assimilation, and is organized by a white frame of logic that is also inherent in the discipline (Martin, 2013).

Statistical literacy is an essential skill. Individuals need to be able to interpret, produce, and be critical consumers of data-based arguments. Thus, as statistical literacy, "is rooted in practices for participating in, critiquing, and (re)shaping structures and discourses in society that are crucial for critical citizenship in society," (Weiland, 2016, p. 988), educational stakeholders must critically investigate how we teach statistics. For the purposes of this paper, I examined six lessons in *Mathalicious* that dealt with statistics. Three of the lessons were from the One Variable Statistics unit, and the remaining three lessons were from the Bivariate Statistics unit. The One Variable Statistics lessons were "Good Cop, Bad Cop," "Police Academy," and "Distributive Properties." The Bivariate Statistics lessons were "Joy to The World," "Pic Me," and "Win At Any Cost."

As part of my analysis, I mapped the lessons from *Mathalicious* onto Battey and Leyva's (2016) framework. There are three dimensions in the conceptual framework: institutional, labor, and identity.

Results

While several themes emerged from this analysis, for the sake of this paper, I am highlighting those that specifically addressed the research questions presented above: mathematics is portrayed as neutral, real-world scenarios are readily manipulated with data, and lack of cultural sensitivity.

Results from the analysis indicate that, in some cases, mathematics was conceptualized and depicted as unconnected to power relations. For example, in the "Distributive Property" lesson, students examine income inequities in the United States. Educators utilizing the lessons are advised to stick to math and not be swayed by the nuances or real-world consequences connected to the data: "They are evaluating which subgroup made the most improvement in their income distribution, rather than trying to determine if the distributions are more equitable. As long as students flesh out their argument and support it with evidence from the data, there is no right or wrong answer" (p. 6). While students can address the problem in several ways, there is no discussion of how the income disparities have real consequences for communities. If students approach the problem in one direction, they will learn that white women had the most significant change in income distribution. If students examine percentage change, then they will conclude that Hispanic women are making the most progress. Students leave with the message that progress can be quantified with numbers. A second instance can be found in "Good Cop, Bad Cop," where teachers are cautioned against

allowing the conversation to deviate from the math (analyzing and interpreting graphical displays). The lesson notes state "While the discussion provides important context for the problem, it could also make it difficult to redirect the conversation back to the math," (p. 5). The message is clear: the data can be separated from the contexts in which they are collected.

In conjunction with the theme that mathematics is neutral, the *Mathalicious* lessons under analysis present conflicting messages about the ease with which real world data can be manipulated and modeled. In each of the lessons, the real-world data presented by *Mathalicious* is devoid of the mathematical complexities that exist in the real world. In the lesson, "Joy to the World," students learn that the data are not as perfect as the linear regressions suggest. Students are cautioned against making definitive conclusions about what increases happiness. Moreover, students learn that while mathematical models can be applied to data, the resulting models do not always tell the complete picture. However, in "Good Cop, Bad Cop" and "Police Academy," students are encouraged to use data to draw conclusions about policies. The data is presented as an easy model and complete enough to make, "decisions about the appropriateness and effectiveness of a policy meant to change that data," (Good Cop, Bad Cop Exemplar Response, p. 1). Thus, while it is important for students to understand that data and subsequent analyses may have limitations, there is a difference in messaging between these three lessons.

These lessons in *Mathalicious* demonstrate that real-world relevance does not equate to cultural relevance or sensitivity. Some fail to consider issues of race, gender, or how communities are impacted by structural or institutional racism. In "Good Cop, Bad Cop," the curriculum guide suggests that some instances of excessive force by police are understandable given that officers, "deal with people in public as well as prisoners in jail, and some officers do this often." Implicit in this message is that some people and communities need excessive policing. The message normalizes or justifies some instances of excessive force. Additionally, there is a disproportionate number of People of Color in jails. By justifying the use of excessive force in prisons, the curriculum also perpetuates that violence against Black and Brown bodies is sometimes necessary. In "Distributive Property," students make comparisons between different subgroups of the population. The comparisons are between white men and women and their "non-white" counterparts. Hispanic and Black men and women are collapsed into two categories (men and women) that imply their lack of whiteness.

Discussion

Of the six lessons examined for this project, five had indicators of or were related to whiteness. The lesson, "Win at Any Cost," did not have any direct connections to whiteness, although it could be argued that the lesson topic is tangential to whiteness. "Win at Any Cost," requires students to use data to make judgments about whether professional sports organizations (Major League Baseball, National Basketball Association, National Football League, and National Hockey League) are spending their money well when they secure talent. For the lessons that had connections to whiteness, the indicator that was observed the most amongst the lessons was, "Mathematics as neutral." This is directly related to the fourth tenet of Martin's framework, "the assertion that knowledge production as neutral and impartial, unconnected to power relations" (p. 323). The second most frequently occurring indicator was "Distribution of classroom and mathematical authority." I contend that this indicator is related to Martin's (2013) second and third tenet: The development of a white frame that organizes the logic of the institution or discipline and the historical construction of curricular models based upon the thinking of white elites. Mathematics curriculums position students differently in relation to mathematics, their peers, their teachers, other people, and their own experiences (Herbel-Eisenmann & Wagner, 2007). The *Mathalicious* curriculum is positioned as the

mathematical authority. Additionally, the curricular model encompassed in *Mathalicious* is like other contemporary mathematics lessons and tasks.

It is troubling that a majority of the lessons had instances of whiteness for many reasons. This analysis reveals the pervasive nature of whiteness in contemporary mathematics curriculum materials and the potential for its use in the continued marginalization and exclusion of the experiences of children of Color. Second, there were many messages of mathematics being neutral. Mathematics as neutral and relationship with deficit discourses students in terms of their racial, gender, and cultural identities are two indicators of whiteness in mathematics education (Battey & Leyva, 2016). While *Mathalicious* does not broadcast the number of teachers or districts that utilize their curriculums, it has been featured in The Washington Post, Education Weekly, and at several mathematics education conferences, including National Council of Teachers of Mathematics and National Council of Supervisors of Mathematics. With such a broad publicity base and open access to their lesson, it is likely that *Mathalicious* has a broad reach.

To begin to dismantle systems of oppression in mathematics education, we must publicly interrogate the policies and practices that perpetuate inequities. This project is essential because, "An ideology of whiteness would then serve to position white people, white ideas, and white behaviors as more valued institutionally and in classrooms, which may not always be visible in terms of curriculum designers and policy developers," (Battey and Leyva, 2016, p. 55). This project provided an example of whiteness in mathematics lessons. More research is needed to examine how mathematics curriculum perpetuates and reinforces whiteness. To facilitate more research on mathematics lessons or tasks as a product of or connected to whiteness, analytic frameworks are needed.

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