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Black Lives Matter in Teaching Mathematics for Social Justice[1]

Jacqueline Leonard
University of Wyoming

Prior to becoming a mathematics educator, I was a teacher in Prince George's County, Maryland. Because of the success I experienced with culturally relevant pedagogy (CRP), it became part of my research agenda along with teaching mathematics for social justice (TMfSJ). Databases like 23andme and Ancestry can be used as a context for CRP and TMfSJ. Data related to education, occupation, military service, and voting records can be accessed online. Our ancestors' experiences can shape our identity and serve as powerful tools for contextualizing mathematics. The stories and counterstories of African Americans can be problematized to show Black lives matter.

KEYWORDS: #BlackLivesMatter, culturally relevant pedagogy, identity, teaching mathematics for social justice

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JACQUELINE LEONARD is Professor of Mathematics Education in the School of Teacher Education, University of Wyoming, 1000 E. University Avenue, Department 3374, Laramie, WY 82071; email: jleona12@uwyo.edu. Her research interests include computational thinking, self-efficacy in STEM education, culturally specific pedagogy, and teaching mathematics for social justice.

When Alex Haley (1976) wrote his poignant novel, *Roots*, it was not only ground-breaking for Black America but an opportunity for America to come to grips with its historical past. The subject of slavery tends to draw angst from broad sectors of the U.S. population, both Black and White alike. Yet, Haley's story, while painful, was a powerful story of survival and resilience. At the time of the production of the mini-series, I wondered how Haley conducted the research to find his ancestors. Sheltered in a close-knit family that welcomed few relatives, I had no idea how to find my own roots.

Then in 1996, as a mathematics teacher in Prince George's County, Maryland, I chose to use genetics and genealogy as a way to engage my students in culturally relevant mathematics. I used the base two pattern to help students understand exponentiation. Beginning with themselves (2^0), their parents (2^1), and grandparents (2^2), students could easily see how they had 32 (2^5) third great-grandparents. After being given a simple family tree, some students went to the National Archives in Washington, D.C., to learn more about their family history. Four students' projects exceeded my expectations. One African American female student reported on six generations in her family, ending with a woman who was born into slavery and simply known as Lizzy. A White female student engraved a tree into a wooden countertop. Her father brought the artifact to class, where she reported on her ancestry. Another White female student brought a dot matrix printout to class that revealed relatives born in the 15th century. She also discovered that she was related to Benjamin Franklin, one of the nation's founders. The fourth student, who was White and male, learned that his grandparents married at the age of fourteen. He was twelve at the time and clearly rejected the idea. Their enthusiasm encouraged me to go to the National Archives as well. There, I found Census records showing my grandmother at the age of two in 1920 and twelve in 1930. Her grandfather, who was 70 years old, was living in the same household according to the 1930 Census. It was surreal to imagine what their lives as sharecroppers were like in Oktibbeha County, Mississippi. At the archives, I was able to trace the maternal side of the family back to my fourth great-grandfather, who was born in South Carolina about 1801.

Purpose

Some teacher educators and K–12 teachers realize the importance of the sociopolitical context in schooling but often ponder how to engage students in discourse that is meaningfully connected to mathematics content. The purpose of the paper is to show mathematics teacher educators and teachers of mathematics how to problematize issues of significance to the community, teach mathematics for social justice, and advocate for equality in education and society more generally.

One issue that has emerged in the Black community in recent years is racial profiling and state violence. After the death of Trayvon Martin in Florida,

#BlackLivesMatter (#BLM) became a national cry when three women—Patrisse Cullors, Opal Tometi, and Alicia Garza—created the hashtag (Taylor, 2016). #BLM uses decentralized leadership and local chapter organizing methods similar to the Occupy movement of 2011 to speak to all issues related to human dignity while asserting the value of Black life (Taylor, 2016).

Quality education (Ladson-Billings, 2017), equal protection under the law (Hill, 2016), equal housing (Rothstein, 2017), and health and wellness (Akom, 2011) are topics that can be mathematicized to teach mathematics for cultural relevance and social justice. Some justice-oriented lessons have already been produced and can be used to link mathematics to #BLM. Himmelstein (2013) used *Stop-and-Frisk* as the basis for learning about central tendency. Similarly, Gustein (2013) investigated *Driving While Black or Brown* with his students in Chicago, Illinois. In these lessons, students used probability to compare the actual number and percentage of traffic stops by race. Using data as evidence, students may engage in letter writing, public service announcements, and other forms of civic engagement to advocate for justice and equality. Yet, even more powerful, as my experience teaching in Prince George's County revealed, is using such lessons to help students to develop personal and social identity.

The Case for Student Identity

The advent of the Internet and DNA testing has changed genealogy research. While my research at the National Archives more than 20 years ago ended with discoveries on the maternal side of the family tree, DNA testing provided matches on the paternal side of my family that were historical and eye-opening. Moreover, these discoveries changed how I viewed myself as an American citizen (i.e., personal identity) and my relationship to others (i.e., social identity). Furthermore, the intersection of race, nationality, gender, and class (i.e., intersectionality) had an impact on my self-efficacy and career goals. The results of my DNA tests as reported by 23andme and Ancestry are shown in Table 1 below.

Table 1
Ancestry Reports

Countries of Origin	23andme	Ancestry
West African	75.6%	76%
Ghana/Ivory Coast	-	31%
Cameroon	-	27%
Nigeria	-	7%
Benin/Togo	-	4%
Senegal	-	4%
Bantu (Cultural Group)	-	3%
European	21.8%	22%
Great Britain, Ireland, Scotland, & Wales	8.6%	10.5%
Scandinavian (i.e., Norway, Sweden, & Denmark)	1.3%	6%
Other European (i.e., France, Finland)	11.9%	5.5%
South & Southeast Asian	1.6%	2%

Data like these can be used to create pie charts for students to study and compare their ancestry. A pie chart of my ancestry based on Ancestry.com is shown in Figure 1 below.

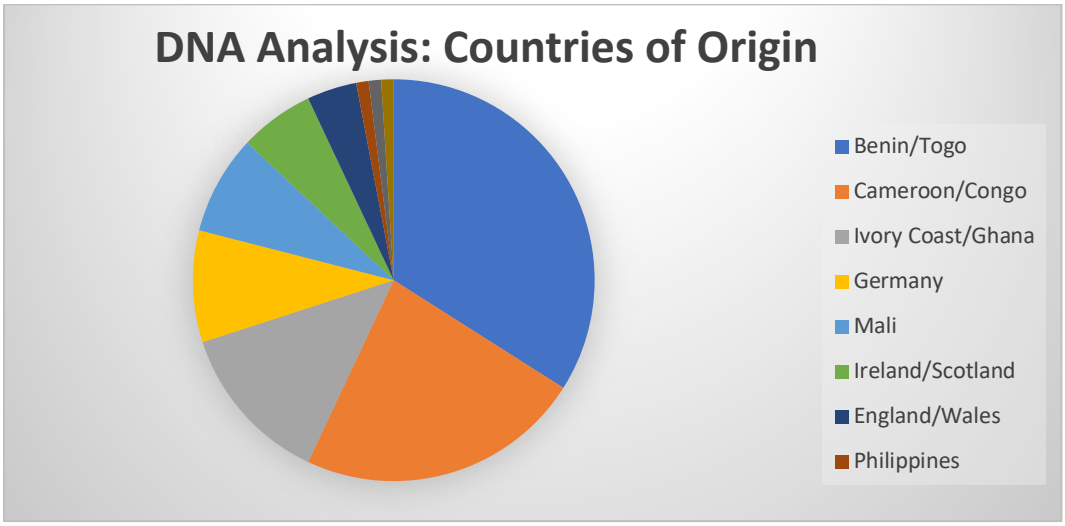
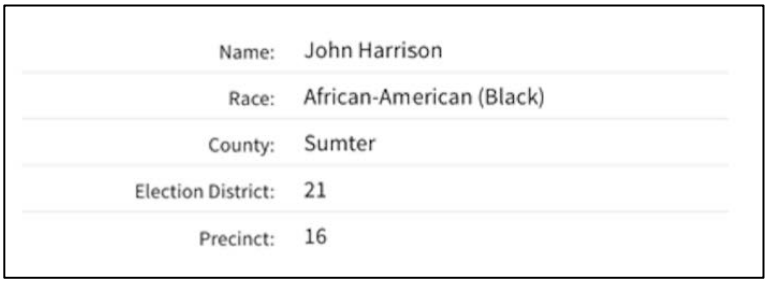


Figure 1. Percentage of DNA from Different Countries of Origin

Through DNA matches, evaluation of family trees, and census records, I learned that I am related to notable figures in American history. Some of these figures

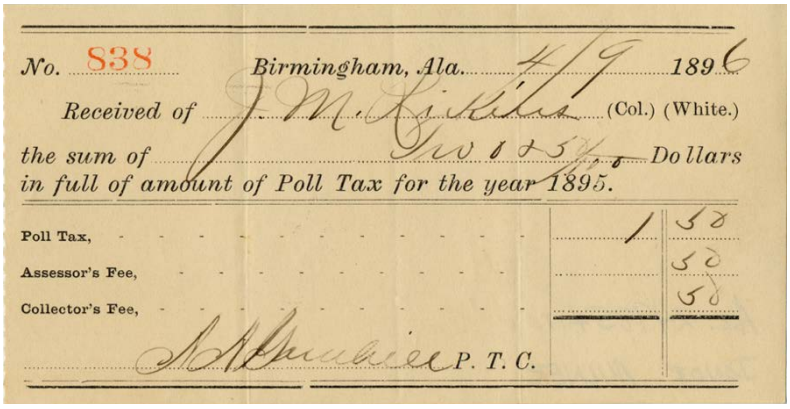
are pre-Civil War presidents of the United States, famous statesmen, and patriots who fought in the Revolutionary War. Furthermore, U.S. census records revealed powerful information about my Black ancestors. On the 1870 census (the first census listing former slaves and newly freed Blacks), the racial category for some of my ancestors was Mulatto, which is a derogatory term used to indicate mixed African and European ancestry. My second great-grandfather was a Harrison slave who was born in Sumter, Alabama. Yet, once freed, the former Harrison slave registered to vote in Sumter, Alabama, in 1867 (see Figure 2, data obtained from Ancestry.com).



Name:	John Harrison
Race:	African-American (Black)
County:	Sumter
Election District:	21
Precinct:	16

Figure 2. 1867 Voting Record

While Black men had the right to vote after 1865, exercising the right to vote in the South was usurped through poll taxes and literacy tests. The poll tax in Birmingham, Alabama (see Figure 3), which was $2.50 in 1895, can be used as a mathematics problem (Leonard, 2019). Wages for farm labor in Alabama were approximately $11.76 per month in 1895. Thus, the poll tax was roughly equivalent to an entire week's work. Few sharecroppers could afford to pay the tax, and, consequently, the number of Black voters in Alabama decreased substantially. Engaging in this type of problematizing connects issues of voting rights to the current sociopolitical context where voter suppression laws are in place (Leonard, 2019).



No. 838 Birmingham, Ala. 4/9 1896

Received of J. M. Kirkles (Col.) (White.)

the sum of Two & 50/100 Dollars

in full of amount of Poll Tax for the year 1895.

Poll Tax,	1	50
Assessor's Fee,		50
Collector's Fee,		50

P. T. C.

Figure 3. 1985 Poll Tax Receipt (publication granted by the Smithsonian Institute)

The knowledge that this ancestor voted so early after the Civil War is awe-inspiring considering the hardships and the violence that he must have endured. As a result, the stories of my ancestors became deeply personal. *Roots* was no longer a story about someone else's family. It signified my story and the stories of my slave and slaveholding ancestors, some of whom fought in the Revolutionary War, signed the Constitution, served as president of the United States, and served in political office. Shortly after the Civil War, one the presidents in my family tree proposed federal education funding and voting rights enforcement for African Americans but was unsuccessful. How does one reconcile the right to life, liberty, and the pursuit of happiness while also refusing to grant those same rights to others? This is the American dilemma. Nevertheless, knowing my background has reshaped my identity and encouraged me to continue breaking down racial and gender barriers as a professor, researcher, and scholar. As the first African American to receive the Fulbright Canada Research Chair Award in STEM Education at the University of Calgary in Alberta in 2018, I engage in culturally relevant pedagogy by encouraging Indigenous, African American, and Latinx students in North America to tell their stories.

Solutions

In this era of anti-Blackness and White nationalism, it is more important than ever to discover one's roots and to learn how people of every race and background are interdependent and interconnected. Teachers of mathematics should use students' culture and history to mathematize problems to show that Black lives matter. Perhaps the common ancestry shared among descendants of former slaves and slaveholders will help us to recognize our humanity. Lessons related to #BlackLivesMatter have already been developed on racial profiling and equal housing. Additional lessons may be developed around voting rights and wages as illustrated above. The stories and counterstories of generations who lived before us provide the backdrop for culturally relevant and social justice-oriented mathematics lessons. The data for these lessons are only a click away.

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