Focusing on Social Justice Issues to Create Relevant and Meaningful Lessons: Curricular Innovation in Math Pathways

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Goals of This Curriculum Session

- Learn about how to create and teach Social Justice Lessons
- Discuss the purpose and implications of Social Justice Lessons
- Explore one lesson in depth
The Problem

● Issues of social justice impact students’ lives every day.

● We need to increase student engagement and interest by creating contexts and learning outcomes that connect to students’ lives outside of the math classroom.

● Course content can become more specific to communities by integrating local equity issues; students feel connected to math while thinking about obstacles to equity within and outside of education.
The Problem

● Students from traditionally underserved populations need to fully engage with relevant material and feel connected to the course, which research has shown to raise success rates.

● Practitioners have a unique opportunity to discuss issues of social justice and equity in their classroom while teaching math content.
The Solution?
The Solution: Curriculum Committee
Carnegie Math Pathways

Traditional Mathematics Sequence

Term 1: Elementary Algebra
Term 2: Intermediate Algebra
Term 3: College Math

Sw

Statway 1 & 2

Qw

Quantway 1 & 2

College math credit achieved in two terms.
Faculty Network Engagement

- Staying Strong
- Learning Analytics
- FIT Lessons
- FIT Rubric & Coaching
- QW Contextualized Lessons
- Bridge Courseware
- FSP Improvement

Development and Improvement Research
The Solution: Social Justice Committee
The Innovation

- 8 new lessons (more coming) that directly address issues of social justice while students are learning mathematics.

- Support for instructors while addressing potentially sensitive topics and discussions.
Lesson Presentations

Statway

- Poverty and Race in America (5.1.3)
- LGB Teen Suicide Rates (7.2.2, 7.3.2)
- Race and Wrongful Convictions in the United States (8.3.2)
- Sex and US Supreme Court Justices' Behavior (10.1.2)

Quantway

- Gerrymandering (1.5)
- Comparing the U.S. Incarceration Rate to that of other countries around the world (1.6)
- Racial disparities in U.S. Incarceration Rates (1.8)
- Polynesian Navigation (4.3)
Poverty and Race in America

Statway 5.1.3 / Two-way tables; probability

**Old context:** Drug testing

**New context:** Population and poverty rates by race

**Summary of Social Justice issue:**
Poverty rates for people of color are more than twice that for whites. Due to media images, most Americans believe the majority of poor people are black. However, while the majority of poor people are people of color only a quarter are black.

**Discussions students will have and tips:**
Discuss consequences of this and the media myth that most poor people are black.
LGB Teen Suicide Rates

Statway 7.2.2; 7.3.2 / Population proportions

**Old context:**
Happiness; Gun law

**New context:**
Attempted suicide rates for lesbian, gay and bisexual teens

**Summary of Social Justice issue:**
Data show that LGB teen attempted suicide rates dropped in states that legalized same-sex marriage.

**Discussions students will have and tips:**
Discuss the effects of legalizing same-sex marriage.
Race and Wrongful Convictions in the United States

Statway 8.3.2 / Difference in two population proportions

Old context:
Opinions on global warming; diet soda

New context:
Convictions and exonerations; global warming

Summary of Social Justice issue:
Data show that African Americans are only 13% of the American population, but also a majority of innocent defendants wrongfully convicted of crimes and later exonerated.
Gender and US Supreme Court Justices' Behavior

Statway 10.1.2 / Chi-Square Goodness-of-Fit Testing

Old context: Cereal Survey
New context: Supreme Court Interruptions

Summary of Social Justice issue:
During oral arguments, Supreme Court Justices who are women are interrupted at a significantly higher rate than those who are men.

Discussions students will have and tips:
Students should consider the importance of hearing diverse opinions in discussions and the impact of silencing groups. Discussions should include reflections on personal experiences with this, the impact of this behavior and brainstorm solutions.
Gerrymandering

Quantway Lesson 1.5 / Percentages / malzugaray@carnegiehub.org

Old context: Credit Card Crunch
New context: Gerrymandering and the Efficiency Gap Function

Summary of social justice issue:
Gerrymandering is a practice of remaking electoral maps in a way that benefits one group of people beyond their quantitative representation in the population (this group may be an ethnicity or a party).

Discussions students will have and tips:
Students will discover how complicated our electoral system is and realize that it is very important to study it and apply their mathematical knowledge to evaluating how well our democracy is working. Students will master one tool for measuring partisan gerrymandering that is currently being presented at the courts.
Comparing the U.S. Incarceration Rate to that of other countries around the world

Quantway Lesson 1.6 / Large numbers, ratios

Old context: Water footprint
New context: Comparing the U.S. incarceration rate to that of other countries around the world

Summary of social justice issue:
The United States contains about 4.4 percent of the world’s population and about 22 percent of the world’s prisoners.

Discussions students will have and tips:
Students may discuss the causes of our high incarceration rate, the disputed efficacy and high cost of the prison system, and the effects on people and communities.
Racial disparities in U.S. Incarceration Rates

Quantway Lesson 1.8 / Percentages

**Old context:** Smoking

**New context:** Racial disparities in U.S. incarceration rates

**Summary of social justice issue:**
The incarceration rate of Black Americans is about 5 times that of White Americans.

**Discussions students will have and tips:**
This discussion will require careful facilitation. There may be students in the room who have personal experience with the criminal justice system. Some students may believe that African Americans are locked up more often because they are more violent than other racial groups. But this conversation is important nationally, so it is worth the effort to bring it to our students.
Polynesian Navigation

Quantway Lesson 4.3 / Linear models

**Old context:** Social Security and Life Expectancy

**New context:** Polynesian Navigation

**Summary of social justice issue:**
The Polynesian Explorers began settling the Oceania region of the South Pacific as early as 3000 BC. In contrast, history books claim *discovery* of this region by European Explorers as late as 1500 AD. The Polynesian’s navigational techniques using natural connection and ingenuity were not recognized by Europeans.

**Discussions students will have and tips:**
The lesson should stimulate a lively class discussion and provide context for understanding a different culture, while allowing students to grapple with some very useful mathematics.
Exploring a Lesson

Poverty and Race in America

(Statway 5.1.3)
Challenges

Making all discussion a positive learning experience.

Preparing faculty to teaching these lessons.

Instructor Notes with strategies for the discussion.
Group Reflection

- Think about your students and how using these Social Justice lessons might work in your context.

- What feedback do you have for using or improving these lessons?

- Other comments and questions?
Get Involved

Want to try these or have ideas?

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