MTC4SJ: A Circle Founded on Social Justice

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Joint Mathematics Meetings
SIGMAA Special Session on Math Circle Outreach Activities that Engage Diverse Audiences

April 8, 2022
MTC4SJ Framework

- Motivation
- Investigation
- Reflection
- Action

Relevant social issue

Mathematizing

Problem-solving

- Identity
  - Viewing yourself
- Diversity
  - Viewing others
- Justice
  - Viewing fairness

Action

- Combat injustices

Identity

Diversity

Justice

Mathematizing

Relevant social issue
How do public schools get funded?

Where does the money come from?
Connecticut Sources of School Funding

- **4.3% Federal**
  - $0.5B
  - Meaning over 95% from state and local sources!

- **58.3% Local**
  - $7B
  - Property tax revenues

- **37.5% State**
  - $4.5B
  - Includes: Special Education, Education Cost Sharing (ECS) Formula, and more

Source: School + State Finance Project
What factors would YOU consider when distributing money to schools and/or districts?
Activity #1: Split the Pie!

- Each group will get 10 data cards for 1 of 4 different school districts in Connecticut. (It’s real data!)
- You will also see overall statistics for the state of Connecticut.
- The 4 districts together are allocated a total of $128,000,000.

Your Goal: Using your district’s data, propose an amount of money you think would be fair to receive from the pool of $128 million.

Your Process:

- On your group’s Jamboard, move the cards (factors) to reflect whether you think the information is a key factor or not in your thinking about what your district should receive.
- Ultimately, propose and amount. Be prepared to briefly share what factors were drivers for you and why.
- Initially, you will not see the other groups’ data. As a next step, you will see their data and have an opportunity to adjust.
Overall Data for Connecticut

- **Resident Student Count**: 513,079
- **Low-Income Student Count**: 219,085
- **English Learners Count**: 42,474
- **Median Household Income**: $78,444 (avg.)
- **Number of Teachers**: 35,439
- **Number of Schools**: 1,506 (168 districts)
- **Minority Enrollment**: 50% (avg.)
- **% Parents not in labor force**: 7.5% (avg.)
- **% Families below poverty**: 9.7% (avg.)
- **% Students with disabilities**: 16.3% (avg.)

How would you divide the $128 million among the four districts?
Connecticut and the Education Cost Sharing (ECS) Formula

This formula distributes about $2 billion every year to public school districts in the state.

There are other versions for charter schools, technical HS, magnet schools, Open Choice, etc.
Connecticut and the Education Cost Sharing (ECS) Formula

3 main parts:

- Foundation
- Student Need Weights
- Base Aid Ratio

Is this fair?
Foundation

This amount represents the estimated cost of educating a general education student with no additional learning needs.

$11,525

Set by law. Can change over time.
## Student Need Weights

<table>
<thead>
<tr>
<th></th>
<th>Low-Income Student Weight</th>
<th>Concentrated Poverty Student Weight</th>
<th>English Learner Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Measured by eligibility for free or reduced-price lunch.</td>
<td>Threshold of at least 60% of students considered economically disadvantaged in a district.</td>
<td>Students that need additional English-language skills.</td>
</tr>
<tr>
<td><strong>Increase</strong></td>
<td>Increases foundation amount by <strong>30%</strong>.</td>
<td>Increases foundation amount by <strong>15%</strong> for each student over the 60% threshold.</td>
<td>Increases foundation amount by <strong>25%</strong>.</td>
</tr>
</tbody>
</table>
# Weighted Student Counts

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resident Student Count</strong></td>
<td>1,580</td>
<td>8,027</td>
<td>8,588</td>
<td>7,390</td>
</tr>
<tr>
<td><strong>Low Income Student Count</strong></td>
<td>464</td>
<td>5,050</td>
<td>1,891</td>
<td>4,288</td>
</tr>
<tr>
<td><strong>English Language Learners Count</strong></td>
<td>49</td>
<td>1,076</td>
<td>353</td>
<td>521</td>
</tr>
</tbody>
</table>

**District A:** \( 1,580 + (0.3 \times 464) + 0 + (0.25 \times 49) = 1,731 \)

**District B:** \( 8,027 + (0.3 \times 5050) + (0.25 \times 1076) + (0.15 \times 8027 \times (5050/8027 - 0.6)) = 9,846 \)
Base Aid Ratio

Based on resources of town to support themselves. Less money = more state aid. Gives the percent of the cost that the town can cover, and the percent the state will cover.

Property Wealth Factor (70%)
Income Wealth Factor (30%)

Percent covered by the state has 2 other influences:
- 3-6 percentage points added for lowest 19 towns
- Minimum = 10% for Alliance districts, 1% in general
**Base Aid Ratio**

*Base aid ratio* represents the share of total education cost that is funded by the ECS grants. It is calculated as:

\[
base \ aid \ ratio = 1 - \left[ 70\% \times \frac{town\ ENGL\ per\ capita}{1.35 \times median\ (town\ ENGL\ per\ capita)} + 30\% \times \frac{town\ median\ household\ income}{1.35 \times median\ (town\ median\ household\ income)} \right]^a.
\]

*ENGL* = equalized net grand list (full fair market value of taxable properties)
ECS Formula Projection

\[ \text{Foundation} \times \text{Weighted Student Count} \times \text{Base Aid Ratio} = \text{Initial Grant} \]

**District A**

\[ \$11,525 \times 1,731 \times 44.45\% = \$8,869,950 \]
<table>
<thead>
<tr>
<th></th>
<th>(A) Mansfield</th>
<th>(B) East Hartford</th>
<th>(C) Greenwich</th>
<th>(D) Manchester</th>
</tr>
</thead>
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<td>521</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$56,807</td>
<td>$55,468</td>
<td>$142,819</td>
<td>$70,736</td>
</tr>
<tr>
<td>ECS Grant Money</td>
<td>$9M</td>
<td>$69M</td>
<td>$1M</td>
<td>$49M</td>
</tr>
</tbody>
</table>
Discussion

What do you think about each component?
What do you think about the ECS formula?
What do you think is “fair”?
Types of School Funding Models

- **Student-based foundation**
  - Base amount per student, money added for particular needs
  - Used in over 30 states

- **Resource-based allocation**
  - Minimum number of resources (staffing) by district, often based on teacher-to-student ratios
  - Used in about 10 states

- **Guaranteed tax base**
  - Equalizes taxes paid on base amount of property in district
  - Used in 2 states (Vermont, Wisconsin)

- **Hybrid**
  - Used in about 5 states
Nationwide Comparison

- All 50 states have separate funding for special education
- All states but 2 (Mississippi and Montana) allocate funding for ELL
- All states but 6 (AK, AZ, FL, GA, ID, SD) allocate funding for low-income students
- 35 states allocate funding to gifted and talented
- 34 states allocate funding to small/isolated schools
Possible Activity #2

Working more with Factors and Weights

- Give the formula for another state, compare/contrast the factors and weights
- What does the formula tell us about the values of a state?

School Funding Formula Proposal

- What factors and weights would you include in a school funding formula? Feel free to create your own or adjust the existing formula.
- This activity isn’t about the political aspect (some factors may be accounted for in other pools of money) but rather about mathematizing and fairness.

Can we quantify equity?
Discussion

How did you use math in this activity?
What kinds of mathematical reasoning were used?
What societal use of math was reflected in this activity?
What would you want your students or colleagues to know about school funding formulas?
Math Teachers’ Circle 4 Social Justice

- Monthly workshops, all resources on website
- **Summer Stars** cohort
  - Leading workshops
- **Connecting Mathematics & Social Justice:** *Lessons and Resources for Secondary Math Teachers*
  - Open-access book
- **Spotlight** educator features
Additional Discussion Questions

- Why do we allocate more money for students from low-income backgrounds? What resources need to be/should be/are provided by those $?
- Why would % minority students or # of students of color be included? Or why might one include $ based on the number of students from specific racial or ethnic groups be part of a formula?

For each of these we’re trying to **unpack the logic of the formula**. If you allocate $ for something, what is your theory about how those $ get converted into student experience or students achievement/outcomes?

**Why would funding formulas vary by state?** Is that legitimate? Should we use one good/fair one for all states? Are there important variations by state that would appropriately be reflected in the state’s formula?