Assignment in the SFUSD

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Who are we?

As a team, our members have helped redesign allocation methods for:

- Boston Public Schools
- NYC High Schools
- Medical residency and fellowship matches
- Market for new economics professors
- New England Program for Kidney Exchange

Outline of tonight's talk

- Problems of the current assignment system
  - Lack of strategic simplicity
  - Wastefulness
  - Well-intentioned updates with bad results
- Proposed assignment systems
- How do they achieve the boards' stated goals?
- School Level: Diversity
- Student Level:
  - Do Students receive a school of their choice?
  - Equitable Access: What are the outcomes for students from historically low CST areas?
- Important Ingredients of successful assignment systems
- Short term and long term changes

Two ailments

- A basketball player hurts his knee and goes to the doctor…
- The doctor tells him that he has two ailments
  - The one he *knew* about (his knee)
  - The one he *didn't know* about (his blood pressure)
- SFUSD also has two types of ailments
  - Lack of diversity is the one we know about. We will get to it in a few minutes.
  - First though, let's talk about a few less obvious, but very important problems…

Three "hidden" ailments

- Lack of strategic simplicity
- Wastefulness
- Well-intentioned updates with adverse effects

Lack of strategic simplicity

- Once a parent knows which schools they like, and how they rank them, it should be in their best interest to just submit this list as is to the SFUSD: This is what we call "**strategic simplicity**".
- Under the current assignment system parents have to think about how best to change the list of schools they submit to SFUSD to get the best outcome.
- **Example:** "I like School A best, but if I don't rank School B first, then I lose my sibling priority there. I think I am unlikely to get School A since it is so popular, so I guess I should just rank School B first."

Strategic simplicity

- Why is strategic simplicity important?
  - Some parents might be better informed about which schools are popular
  - Some parents might not realize that they are being hurt by telling the truth
  - Should parents have to think about what other parents are doing in order to properly navigate the system?
- We think that as much as it is possible, ***the school assignment system should not reward those who know how to "play the game" and punish those who don't***
- All systems we propose are strategically simple

Wastefulness

- Say that Ann prefers School A and Ben prefers School B. Also assume that Ann and Ben are demographically the same
- Now, say that the system assigns Ann to School B and Ben to School A
- This is wasteful – we could give Ann and Ben schools they both prefer without hurting diversity
- The current system makes mistakes just like this
- None of the systems we propose are wasteful

Economic engineering

- All assignment systems we propose are strategically simple and non-wasteful
- This wasn't easy – it is the result of careful design, guided by decades of research

Well-intentioned updates can have adverse effects

- We have noticed that the existing system is updated every few years
- It is important that the system is changed without reintroducing wastefulness or a lack of strategic simplicity
- **Think of the school assignment system like a TV set**
  - We (the economic engineers) designed it
  - We will give you "dials" by which its performance can be adjusted
  - But if the "dials" don't seem to attain your goals, the correct response is to contact a repairman (us or someone like us)
  - Most people would never open up a TV and try to fix it themselves

Dealing with SFUSD's "hidden" problems

- Whatever assignment system you adopt, it should be strategically simple and non-wasteful
- Steps should also be taken to ensure that well-intentioned updates don't undermine the redesign
- In the paradigm we are suggesting, this entails
  - Only changing the mechanism through the provided "dials" (which we spoke about last time)
  - If bigger changes are needed, contact someone with training in economic engineering (we are happy to fill this role)

Baseline assignment systems

In all systems, students are asked to rank 7 schools

Then the student assignment system does the following without any further input.

Local assignment
- Initially assigned to neighborhood school
- Students can either
  - only rank city-wide schools (restricted)
  - rank all schools (unrestricted)
- Transfers are processed when feasible

Lottery-based assignment
- Students are not initially placed anywhere
- Assignment is based on what schools students rank
- Transfers are processed when feasible
- Two additions
  - Academic diversity preference (ADP)
  - Local preference (LP)

Preferences

In the lottery-based options, we introduce the possibility of:

- **Local preference (LP)**: Students who live in the attendance area of the school receive a higher preference
- **Academic diversity preference (ADP)**: For each census tract, calculate the average CST score over the past three years. Students who live in census tracts in the lower two quintiles receive a higher preference

Intuition and the local options

Diversity through geography

- Local restricted pushes very hard to keep students at their local school
- Local unrestricted gives more leeway for students to "transfer" out of their local school

Intuition and the lottery-based options

Diversity through demand

- Lottery-based with ADP tries to explicitly help students from underserved census tracts
- Lottery-based with LP gives preference to student who are near a given school
- Lottery-based with both LP and ADP helps those from underserved census tracts while also giving preference to local students

Questions

- Does pushing for students to go to their local school help achieve schools a more diverse student body? What about residential segregation?
- Can relying on student demand help achieve schools that have a diverse student body? Hasn't this approached failed in the past?
- Simulations will shed light on these questions

The five options

1. Lottery-based with local school preference
2. Lottery-based with academic diversity preference
3. Lottery-based with both local school and academic diversity preference
4. Zones
5. Local school with restricted choice
6. Local school with unrestricted choice

Details about the simulations

- We use Round 1 and Round 2 requests
- Students that cannot be assigned to one of their choices are assigned to the nearest school with available seats in the GE program

Aggregate diversity results

Kindergarten

Simulation	Under 60% filled	Over 60% Latino	Over 60% Af.-Am.	Over 60% Chinese	Over 60% White	Over 40% English Learner	Over 60% from Low-CST Census tracts	Over 60% Low SES
Lottery LP (1)	1	8	0	6	1	0	10	7
Lottery ADP (2)	1	8	0	6	1	0	9	7
Lottery ADP, LP (3)	1	8	0	6	2	0	9	7
Local restricted (5)	1	8	0	5	1	0	14	4
Local Unrestricted (6)	1	8	0	6	1	0	10	6

LP: Local Preference, ADP: Academic Diversity Preference

No big differences here (apart from maybe 5)

19

Aggregate diversity results

9th grade

Simulation	Under 60% filled	Over 60% Latino	Over 60% Af.-Am.	Over 60% Chinese	Over 60% White	Over 40% English Learner	Over 60% FBB/BB	Over 60% Low SES
Lottery LP (1)	4	1	0	0	0	1	2	6
Lottery ADP (2)	5	1	0	0	0	1	2	5
Lottery ADP, LP (3)	4	1	0	0	0	1	1	5
Local restricted (5)	3	0	0	0	0	0	2	4
Local Unrestricted (6)	4	1	0	0	0	0	3	6

LP: Local Preference, ADP: Academic Diversity Preference

Again, no big differences here

20

How do the 5 options: 1,2,3,5,6 fare?

- We compared the 5 options in terms of the goals stated by the board when looking at schools.
- One option performed less well: Local Restricted (Option 5)
- The other options: 1,2,3,6 performed very similarly.

Is there any difference between 1,2,3, and 6?

How do the children fare under various options?

21

Who gets one of their choices?

Kindergarten

Option	First choice	One of their choices
Lottery LP (1)	60%	82%
Lottery ADP (2)	61%	80%
Lottery ADP, LP (3)	62%	81%
Local restricted (5)	57%	65%
Local Unrestricted (6)	59%	79%

LP: Local Preference, ADP: Academic Diversity Preference

Once more, local restricted works less well. Significantly fewer kindergartners receive a school of their choice

22

Who gets one of their choices?

9th grade

Option	First choice	One of their choices
Lottery LP (1)	63%	91%
Lottery ADP (2)	64%	88%
Lottery ADP, LP (3)	66%	89%
Local restricted (5)	57%	68%
Local Unrestricted (6)	63%	90%

LP: Local Preference, ADP: Academic Diversity Preference

Again, local restricted doesn't give as many students one of their choices

23

Looking more carefully at underserved students

- So far, options 1,2,3 and 6 look about the same on diversity grounds.
- Options 1,2,3, and 6 also look very similar when looking at how many students get a school of their first choice or get one of their choices
- How about equitable access? What are the outcomes for underserved students?

24

Possible effect on achievement gap

Kindergarten	Percent who attend an API≥8 school	
	Low CST census tracts	Other census tracts
Lottery LP (1)	17%	46%
Lottery ADP (2)	29%	40%
Lottery ADP, LP (3)	29%	40%
Local restricted (5)	14%	47%
Local Unrestricted (6)	16%	47%

Options with ADP (Academic Diversity Preferences) send almost twice as many kindergartners from Low CST census tracts to high API schools

Adding LP to ADP makes no difference; compare (2) & (3)

25

Possible effect on achievement gap

9th grade	Percent who attend an API≥8 school	
	Low CST census tracts	Other census tracts
Lottery LP (1)	45%	74%
Lottery ADP (2)	72%	60%
Lottery ADP, LP (3)	72%	60%
Local restricted (5)	37%	72%
Local Unrestricted (6)	44%	74%

Options with ADP send about 2/3 more 9th graders from Low CST census tracts to high API schools

Adding LP to ADP makes no difference; compare (2) & (3)

26

How do the 5 options: 1,2,3,5,6 fare?

- Options with an Academic Diversity Preference (ADP) increase the proportion of kids from low CST census tracts neighborhoods that are able to go to high API schools (8 or more) by a lot.
- Adding a Local Preference (LP) to ADP does not mitigate the results. It can be added on "for free".
- Do kids receive a school of their choice? (Can this help with on-time participation?)

27

Possible effects on participation

Kindergarten	Low CST census tracts		Other census tracts	
	1st choice	Any choice	1st choice	Any choice
Lottery LP (1)	71%	89%	56%	78%
Lottery ADP (2)	95%	100%	45%	70%
Lottery ADP, LP (3)	95%	100%	46%	71%
Local restricted (5)	65%	72%	53%	61%
Local Unrestricted (6)	69%	87%	54%	74%

Options with ADP give 95% of kindergartners from Low CST census tracts their first choice

Adding LP to ADP makes no difference; compare (2) & (3)

28

Possible effects on participation

9th grade	Low CST census tracts		Other census tracts	
	1st choice	Any choice	1st choice	Any choice
Lottery LP (1)	61%	91%	58%	93%
Lottery ADP (2)	89%	100%	46%	84%
Lottery ADP, LP (3)	89%	100%	48%	85%
Local restricted (5)	50%	55%	55%	78%
Local Unrestricted (6)	60%	89%	58%	92%

Options with ADP give 89% of kindergartners from Low CST census tracts their first choice

Adding LP to ADP makes no difference; compare (2) & (3)

29

How do the 5 options: 1,2,3,5,6 fare?

- What attributes of the mechanisms were important to achieve the boards goals
- For Schools: Reverse trend of racial isolation and concentration of underserved students in the same school
- For Students: Equitable access to high quality opportunities

30

How do the 5 options: 1,2,3,5,6 fare?

For Schools: Restricting the schools parents can rank (restricted local: option 5) performed less well.

For Students:

All Students: Restricting the schools parents can rank (restricted local: option 5) performed less well: Fewer students receive a school of their choice, or their first choice school

How do the 5 options: 1,2,3,5,6 fare?

Equitable Access & Achievement gap: Focus on underserved students (students who live in historically low achievement census tracts):

Schools they attend

- Adding an Academic Diversity Preference (ADP) increases their chance to go to a high API school by a lot.
- Adding a local preference (LP) on top of ADP does not have a big impact

Choices they receive

1. Adding an ADP increases their chances to get a school of their choice by a lot
2. Adding a local preference (LP) on top of ADP does not have a big impact

Doing the best we can

- One of our tasks was to design an assignment system that improved school diversity and increased equitable access
- However, there are several constraints which we must deal with
  - Residential segregation
  - Present demand patterns
  - Legality
- Given these constraints, it is our opinion that the results we just showed you are about as good as can be expected ***without changing other district policies***

Changing the constraints

- Residential segregation and legality are constraints that cannot be altered, but demand patterns are
- **SFUSD could possibly change demand such that diversity is improved by altering**
  - Program placement
  - Transportation infrastructure
  - Which schools are city-wide
- Changing demand helps if the assignment system responds to student preferences (strategic simplicity allows students to really express how much they like various schools).
- Our proposed mechanisms are ***designed*** to do this well

Change demand patterns

- In the short term: Assignment system can only work within the current limits
- In the long term: Changing demand patterns can help to increase diversity even more.
- This requires a demand analysis, which is beyond the scope of the current project, but can be done.

Our Role at SFUSD

We are open to:

- helping SFUSD to implement a good assignment system.
- Monitoring how well the new assignment system does.
- Potentially, conducting a demand analysis to help with longer term placement of resources.

Conclusion (1)

Good Mechanisms

- Strategically Simple
  - Makes the parents' decisions how to rank schools easier
  - Allows to gauge demand for different schools
- Non-Wasteful
- Allow for updates

The current mechanism does not fulfill these criteria

All our options do.

37

Conclusion (2)

Important Factors to help achieve to boards goals (diversity, equitable access).

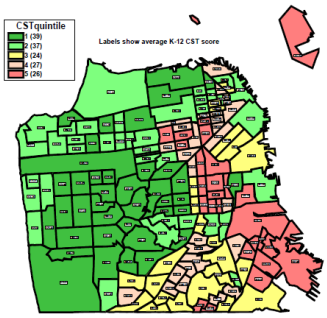
1. Do not limit the schools students can rank:
   - Helps to make schools more diverse
   - Helps students to receive schools of their choice.
2. Adding an Academic Diversity Preference leads to (much) more equitable access
3. Adding a Local Preference to an Academic Diversity Preference came at no cost.
   - Local Preference makes a schools assignment process more predictable.

Short term plans: Change the Assignment process.

Long term plans: A demand analysis to assist with placing resources strategically to increase diversity.

38

Map of Low CST Census Tracts



39

Addendum

The next slides show the percent of Af.A and Latinos in some focus schools, as requested.

The data show only percentages, as requested. Though a look at absolute numbers could be useful, as in the end it may matter not only what percent Af.A and Latinos go there, but also how many such children go there.

% African American and Latino (HS)

Assignment Option	ISA HS	Jordan HS	Mission HS	O'Connell HS
1. Lottery Neighborhood	72%	83%	50%	79%
2. Lottery Academic Diversity	75%	80%	40%	77%
3. Lottery Academic and Nhood	74%	79%	34%	75%
5. Local with City Wide Choice	58%	47%	54%	65%
6. Local with ALL Choice	75%	70%	53%	71%
First Choice	83%	94%	78%	83%
Boundary	52%	39%	44%	59%

% African American and Latino (ES)

Assignment Option	Carver	Cobb	Drew	Flynn	Glen Park
1. Lottery Nhood Priority	43%	22%	66%	55%	45%
2. Lottery Academic Diversit Priority	43%	25%	63%	58%	48%
3. Lottery with Academic and Nhood Priority	41%	23%	65%	58%	45%
5. Local with CityWide	49%	22%	58%	46%	33%
6. Local with All Choice	46%	30%	64%	49%	39%
First Choice	76%	60%	87%	56%	50%
Boundary	72%	58%	53%	48%	16%

% African American and Latino (ES)

Assignment Optio	Harte	Malcolm X	Muir	Revere K8	Webster
1. Lottery Nhood Priority	33%	32%	23%	59%	21%
2. Lottery Academic Diversi Priority	30%	27%	24%	57%	33%
3. Lottery with Academic and Nhood Priority	30%	27%	26%	58%	33%
5. Local with CityWide	51%	48%	43%	54%	21%
6. Local with All Choice	36%	27%	29%	54%	25%
A First Choice	81%	56%	80%	73%	63%
Boundary	80%	82%	56%	42%	24%