



Best Practices for K12 Student Assignment

Parag Pathak

June 30, 2021





Agenda

Introductions

Enrollment as Allocation Problem

Centralize, Streamline, and Simplify

Q&A and Discussion

**Please ask
questions
throughout in
the chat, as
well**



Agenda

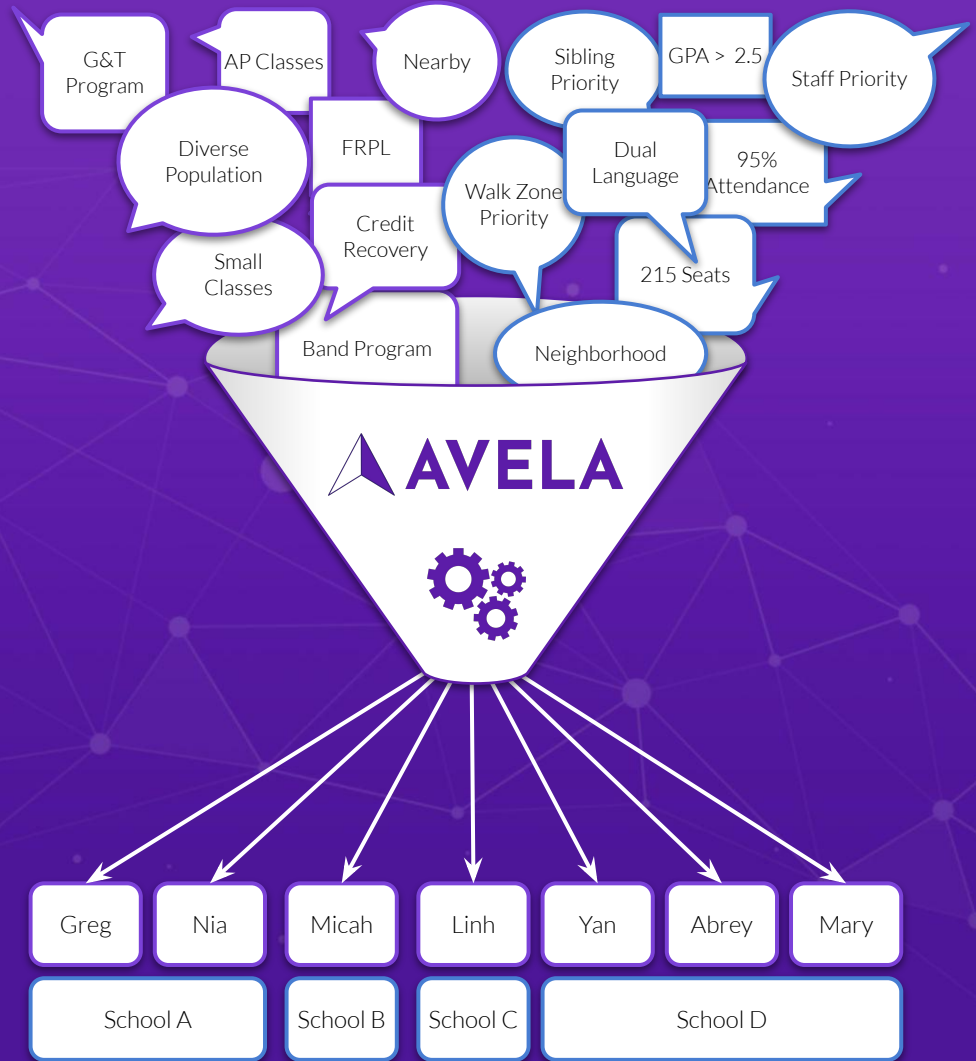
Introductions

Enrollment as Allocation Problem

Centralize, Streamline, and Simplify

Q&A and Discussion

Avela is the platform for making equitable enrollment and allocation decisions



Avela Match™

Student enrollment and assignment platform

- **Modern and Delightful**

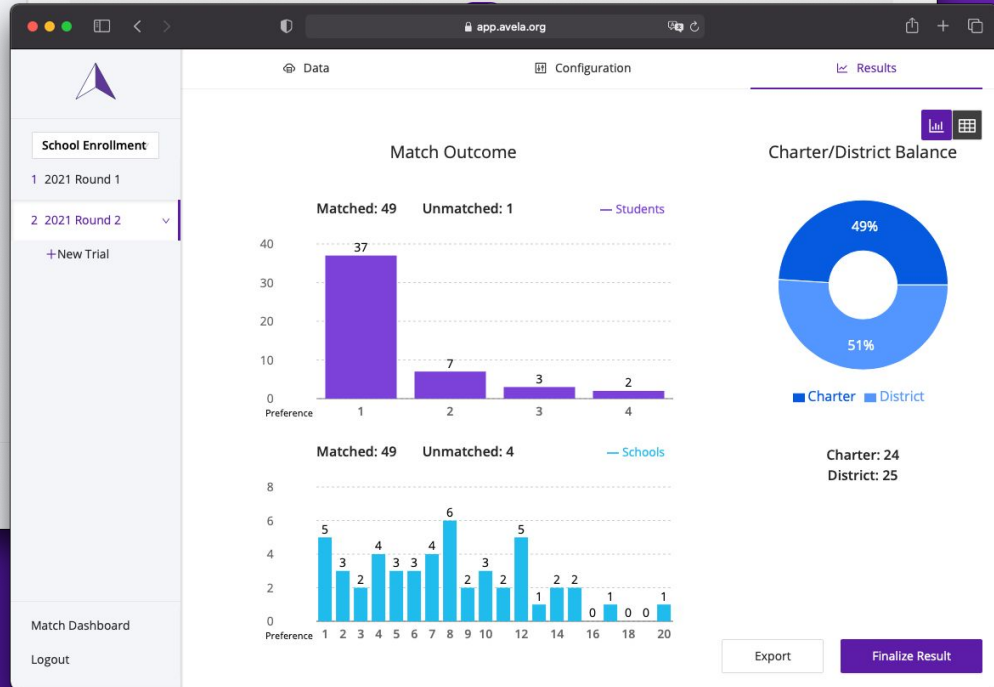
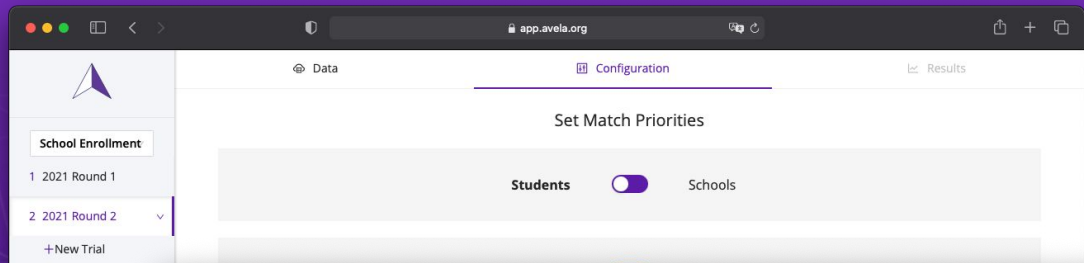
- Cloud-hosted, web-based
- Drag-and-Drop Interface
- Easy Configuration

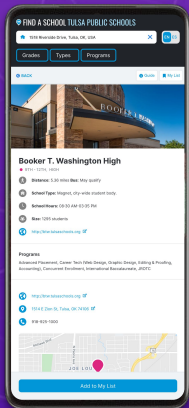
- **Powerful and Flexible**

- Supports wide range of assignment policies
- Match on any data field
- Experiment & Run Scenarios

- **Easily Upload Data**

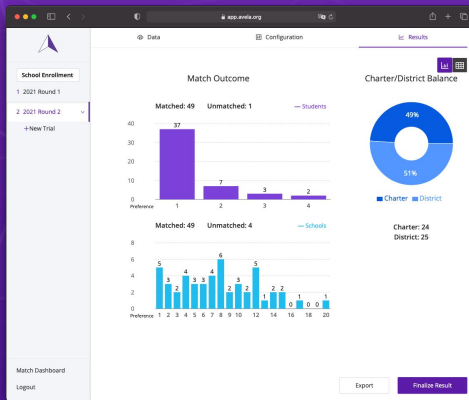
- Excel/CSV Files
- Salesforce and SIS Integration Coming soon





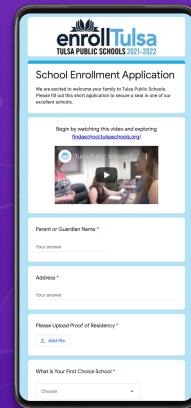
Avela Explore™

Our mobile-first school finder platform empowers families to choose the right school for their children. Launching October 2021.



Avela Match™

Our web software enables educators to run assign students to learning opportunities with a click, no code required.



Avela Apply™

Online application capture software that integrates seamlessly with our explorer and matching software. Coming soon!





Efficient

Avela is easy to use and quickly generates suggested matches



Equitable

Manual placements are subject to implicit bias and reward privilege.



Empowering

Opaque processes are not auditable and reduce trust and agency.



Advisory Services

We'll partner with your team to design the optimal approach and ensure smooth implementation.



Strategy

Evaluate current processes and recommend improvements.



Matching Design

Identify the optimal matching criteria and configuration.



Implementation

Communicate and manage changes for smooth rollout.





Built on Nobel Prize Winning Science

Avela's software is built on sophisticated matchmaking algorithms pioneered by David Gale, Tayfun Sönmez, Lloyd Shapley, and Al Roth.



Market Design Experts

Avela was co-founded by Parag Pathak and Joshua Angrist, Professors of Economics at MIT and leaders in the field of market design.

Parag Pathak

Co-Founder & Chief Economist, Avela
Class of 1922 Professor of Economics, MIT

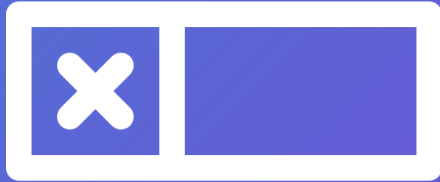


- Co-Founder, School Effectiveness & Inequality Initiative
- Co-Founder, NBER Working Group on Market Design
- Advisor to School Districts, Nonprofits, and US Army
- John Bates Clark Medal Recipient
- PhD, Harvard; AB, Harvard

parag@avela.org



POLL



What's your primary role?

1. District Administrator
2. CMO Administrator
3. Teacher or Other Educator
4. Researcher, Professor, Thought Leader
5. Advocate / Nonprofit / Foundation
6. Consultant
7. Other





Agenda

Introductions

Enrollment as an Allocation Problem

Centralize, Streamline, and Simplify

Q&A and Discussion

School Assignment Evolving



Uncoordinated enrollment across sectors

Coordination across sectors



Opaque appeals process

Standardized appeals process



Inefficient process that can be gamed

Efficient game-proof algorithm

Uncoordinated rosters and waitlists

Central enrollment office



Multiple offers for each student

Single offer for each student

Separate on-site applications

Common application with ranked schools



Different application deadlines

Standardized application



Inaccessible information

Same application deadline

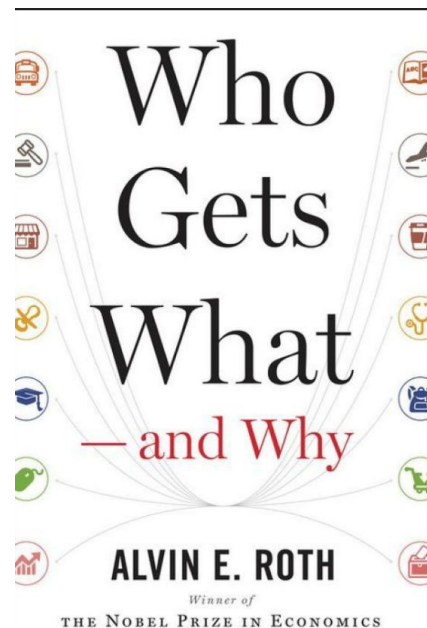
Brochures and fairs for families

RECOMMENDATION:

Treat Enrollment As A Matching Market

What is a Matching Market?

- Usually, a price is used to clear markets. If you are willing to pay more than me, you will be assigned the good before me.
- But in many situations, you can't just get what you want by paying more; you must also be chosen.
 - E.g., A lot of people want to go to MIT, but the admissions committee at MIT must also want you
- Matching theory helps determine what happens in situations when prices are not available
 - It helps answers the question of who is paired with whom



Matching in Action



Kidney Donation
and Exchange



Medical
Residencies



Army Cadet
Branching



Enrollment
Lotteries



School Enrollment: A Matching Problem



- Popular seats are scarce goods (supply)
- Families have heterogeneous preferences for schools (demand)
 - Distance, educational offerings, etc.
- Cannot use a price to make allocations - need policies (“market design”)
- Public school seats must be allocated fairly, efficiently, and transparently
 - Policies affect supply, demand, and how the market clears



RECOMMENDATION:

Set Realistic Goals and Manage Expectations

Set Realistic Goals



- Student assignment policy is needed because of scarcity of school seats
- Solution: create more desirable seats! Easier said than done...
- Important to be realistic about what problems assignment policy can address and the time horizon
- Student assignment is often an easy scapegoat for other issues
- Doesn't mean we shouldn't aim to do better!



Short-Run vs. Long-Run Goals



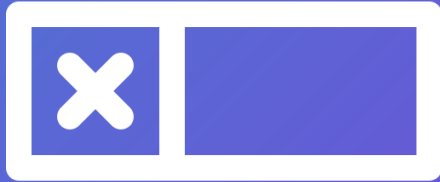
Short-Run Goals

- Have more students participate
- Have students learn about and rank more schools
- Retain more students in the district
- Have more students enroll in the school they are offered; have fewer students change assignment
- Have schools experience more roster stability
- Use information generated by choice system to inform school portfolio planning

Long-Run Goals

- Optimize transportation
- More efficiently use school facilities and plan different scenarios
- Create and expand programs in high-demand
- Use school choice process to improve schools and expand access
 - Depends on inputs and willingness to make tough decisions

POLL



What Areas Need the Most Improvement in Your District?

1. Helping Families Make Better Decisions
2. Building Trust Between School Sectors
3. Managing the Portfolio of Schools
4. Using Enrollment Policy to Drive Innovation
5. Transportation Policies





RECOMMENDATION:

Tailor Design for Local Context

One Size Fits All? Or Does It....



- Several districts around the country have adopted new policies
 - New York City, Boston, New Orleans, Denver, Washington DC, Chicago, Indianapolis
- Wealth of knowledge from practitioners and research community
 - Systems are a work in progress -- always being tinkered with and being improved
- No need to reinvent the wheel; we should learn from each other
 - We aim to share best practices with our newsletter (avela.org/join)
 - Avela's Advisory Services team (avela.org/services)
 - Research lab at MIT (seii.mit.edu)
 - Expert practitioners from districts who have built systems and can provide advice
- Each city's approach needs to be tailored to the community goals and constraints
 - E.g., transportation? which admissions priorities? which sectors participate?

Local Context Matters: Example from NYC



- New York City operates 3 specialized exam schools
 - Brooklyn Tech, Bronx HS of Science, Stuyvesant
 - In the early 2000s, they created several new exam schools
 - Hecht-Calandra Act governs admissions at the original exam schools
 - New schools are part of their main assignment system
 - Interpreted as requiring separate admissions process for these schools
- Implication: A small number of applicants obtain two offers of schools.
 - An offer from a specialized exam high school and traditional high school



DEC. 3, 2010:
APPLICATIONS
DUE

FEB. 11, 2011:
SPECIALIZED ROUND
RESULTS

MARCH 31:
MAIN ROUND
RESULTS

8,239
or 10% are not
matched to any
school and have
to reapply by:
APRIL 15

MAY 27:
SUPPLEMENTAL
ROUND
RESULTS

JUNE 3:
ALL
APPEALS
DUE

END OF
JUNE:
APPEALS
RESULTS

78,747

8th graders apply to 647
programs in 394 high schools.

Of the 78,747,
28,281 take the exam (in October) for
8 specialized high schools. Others
apply to LaGuardia High School ...

... **5,984** are accepted:

Brooklyn Technical High School	1,951
The Bronx High School of Science	1,044
Fiorello H. LaGuardia High School of Music & Art and Performing Arts	962*
Stuyvesant High School	937
The Brooklyn Latin School	572
Staten Island Technical High School	352
High School for Mathematics, Science and Engineering at City College	228
High School of American Studies at Lehman College	177
Queens High School for the Sciences at York College	143

*382 students also received an offer to one of the other specialized schools.

70,508
or 90% are
matched in
total.

*Every student will
ultimately be matched.*

37,822
or 43% are
accepted at
their first
choice.

65,082
or 83% are
accepted at
one of their
top five
choices.

Percentage of
students
unmatched in
the main round

'04	15%
'05	11%
'06	9%
'07	8%
'08	7%
'09	7%
'10	8%
'11	10%

Local Context Matters: Waitlist Policies

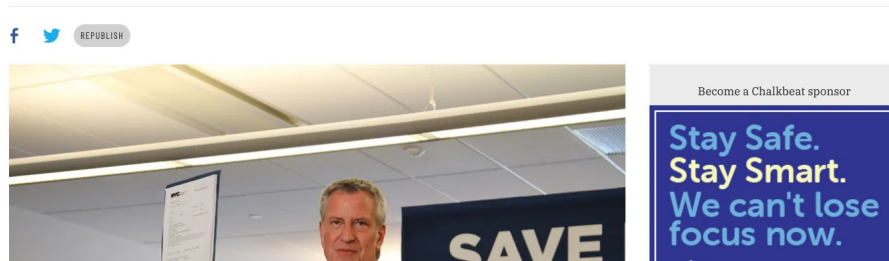


- Who Manages Waitlists: Schools or Central Office?
- Boston Public Schools manage waitlists centrally
- In other districts, waitlists are managed by school
 - DPS has allowed some schools to enroll students post-match
- NYC switched to waitlists after using a second round for many years

CHARTERS & CHOICE

Goodbye round two applications, hello waitlists: NYC announces changes to high school admissions

By Christina Veiga and Alex Zimmerman | Updated Aug 15, 2019, 7:00pm EDT





Agenda

Introductions

Enrollment as an Allocation Problem

Centralize, Streamline, and Simplify

Q&A and Discussion



RECOMMENDATION:

Centralize Governance

Who's in Charge? Who Sets the Policies?



- It's hard to implement admissions policies without a central governing authority
 - Schools with lots of freedom can create confusion and potential for corruption
- A central governing authority restricts opportunities for enrollment to occur outside process via transactions at schools
- If schools can set their own admissions policy without oversight, we've seen that obstacles to apply sometimes slip in
 - If a school is evaluated based on the performance of their students, this incentive can be strong
 - E.g., open houses, interviews, and soft screening
 - This can make sense in some cases, e.g., with special programming, but should be monitored carefully

Who's in Charge? Who Sets the Policies?



- Example from Chicago's GoCPS

PRINCIPAL DISCRETION

➔ What is Principal Discretion?

Principal Discretion is a process that allows principals of the Selective Enrollment High Schools to fill a designated number of seats for ninth grade, outside of the regular selection process, and in strict compliance with the Principal Discretion guidelines. The Principal Discretion process takes place in March, following the first round of regular selection. Information about the process will be posted at go.cps.edu in the spring. Principal Discretion only applies to the 11 Selective Enrollment High Schools.

- Single point of accountability important for families in distributing, collecting, and processing applicants
- Central body can be tasked with regular continuous improvement, maintenance, and oversight

A photograph of a classroom with rows of desks and chairs, viewed from the back of the room. The image is overlaid with a semi-transparent purple filter. In the center of the front wall, there is a blackboard and a small framed picture above it. To the right, a poster is visible on the wall.

RECOMMENDATION:

Accessible Common Application and Single Deadline

Common Application



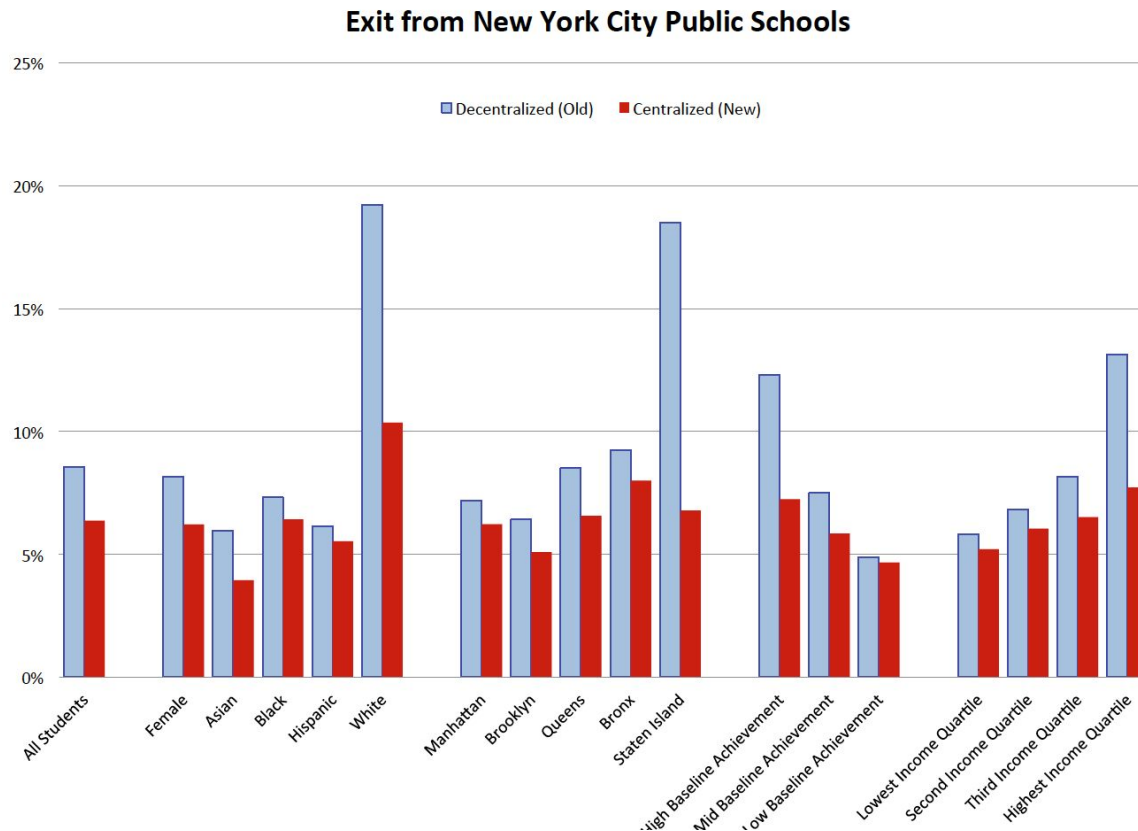
- Recommendation: Single Application / Common App
 - Create a single, universal application where families can list all of their public school choices in order of preference
- (Unranked) Common Application systems are an alternative
 - Makes it easier to apply to multiple schools
 - But since a student can only attend one school, the system must process those with multiple offers
 - Schools must determine how many offers to make
 - In practice, this creates uncertainty and false hopes for applicants, and burdens schools to forecast yields, oversee waitlists, and manage the aftermarket

Single Deadline and Single Best Offer



- Single Deadline
 - Avoid different deadlines for different schools/types
 - Manage screening on open houses or via application portfolios/essays
 - “Early admissions”
 - Minimize number of rounds
 - Reduce administrative burden
 - “Make market thick” to give as many options overall
- Recommendation: Single best offer (“SBO”)
 - Ranking allows computer algorithm to determine the best possible offer
 - Automates the human part by ensuring additional offers are given to the next student in line
 - Eliminates congestion and waste due to holding offers until the end - “deadline effect”

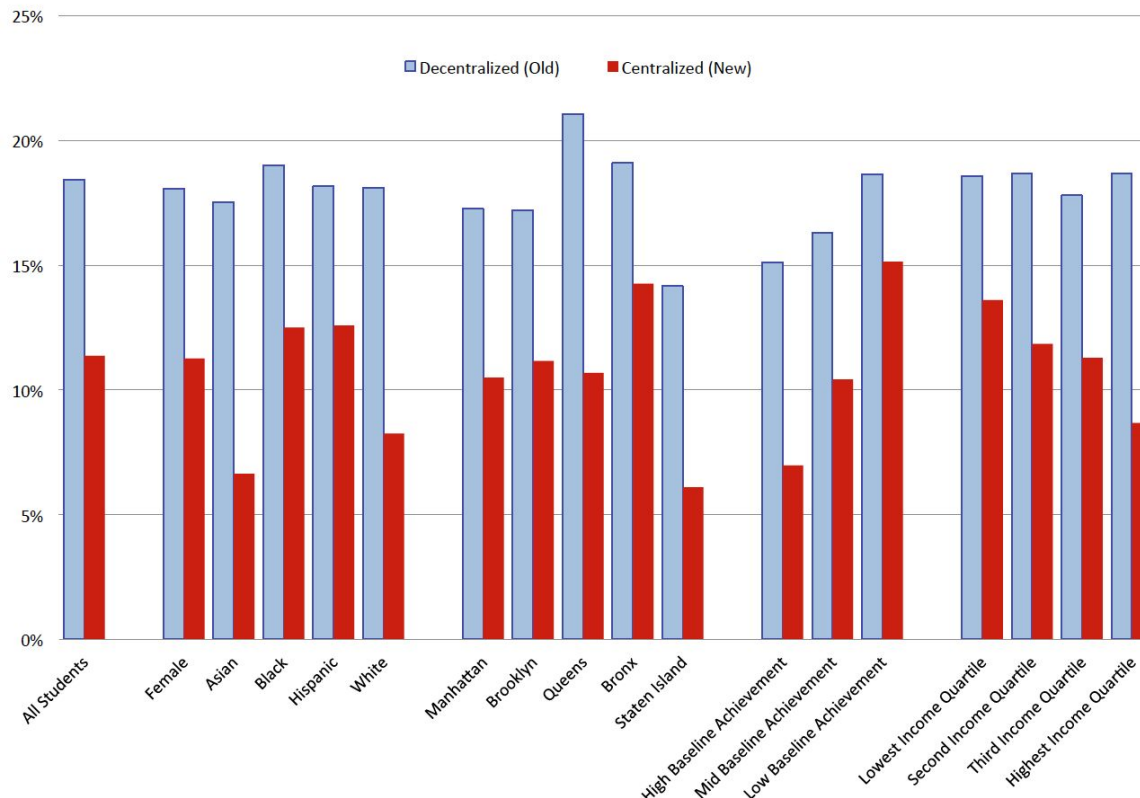
Congestion from Multiple Offers Led to Exit in NYC



Congestion from Multiple Offers Led to Non-Compliance in NYC



Noncompliance with New York High School Assignment

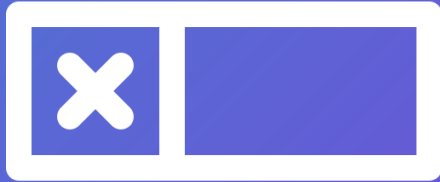


Unifying Sectors



- Recommendation: Unify all school sectors (exam schools, charter schools, traditional district schools)
 - Pioneered in New Orleans and Denver
 - Then Washington DC, Indianapolis, Chicago, Tulsa, among others
- Why?
 - Further simplification for parents
 - Improve relationships across sectors
 - Gain reliable information about demand
- How?
 - Initial policy changes can be sticky so aim high or devise structure for continuous modification

POLL



How centralized or unified is enrollment in your district?

1. No choice, entirely neighborhood/assigned
2. Not centralized, each school manages their own enrollment.
3. District schools are mostly centralized, with a few exceptions (e.g. Magnet Schools)
4. District schools are fully centralized.
5. District and charter schools are fully unified (for enrollment)
6. District is not centralized, but charter sector is coordinated/centralized.
7. I don't know / Not Applicable





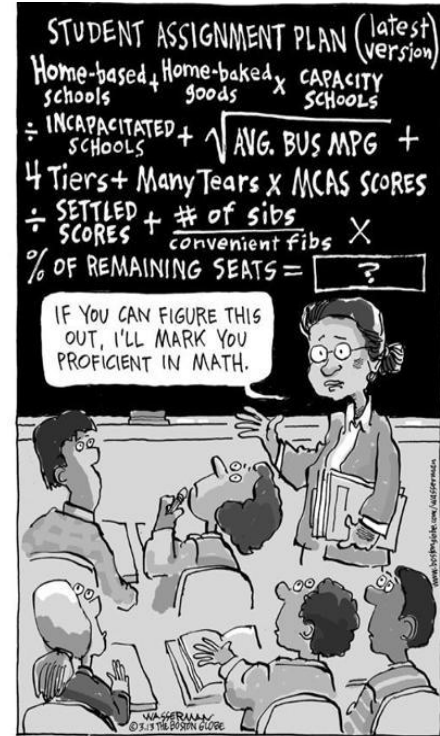
RECOMMENDATION:

Simplify Messaging and Invest in Communication

Recommendation: Keep it Simple!

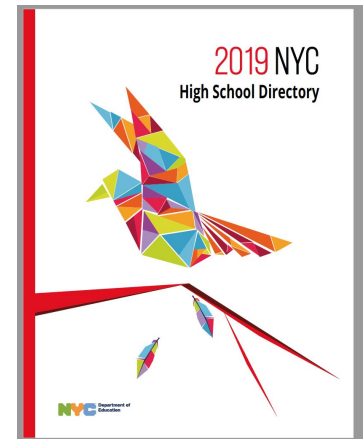
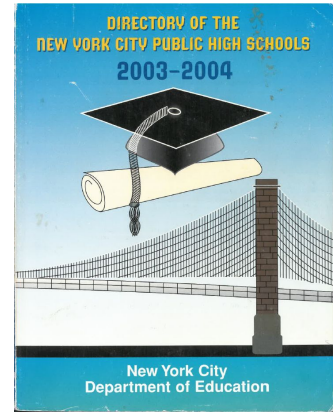


- Streamline and simplify as much as possible
- Make it easier for families to understand and participate:
 - Improve communication
 - Set clear timelines
- Simple and easy to explain rules are essential for building trust in process



Application Processes

- Recommendation: Use an accessible and equitable application
 - Invest in user experience (UX),
 - Pilot test with families, gather feedback
 - Focus on ease of use
 - ADA friendly website
 - Mobile friendly applications
 - Integration with school finder and mapping tools
 - User expects technology to be like other online experiences
 - Create other routes to application
 - Application at sending school with guidance counselor
 - Paper/phone options



Communication Recommendations



- Emails
- SMS / Text
- School fairs / expos
- Multiple languages
- Help desk
- Confirmation of choices
- Build in extra time for revisions



Najya Hannah-Jones. Henry Levitt/for The New York Times

Create a Quality School Finder



- **Accessible**

- Mobile Friendly
- Multilingual
- ADA Compliant

- **Dynamic Updating**

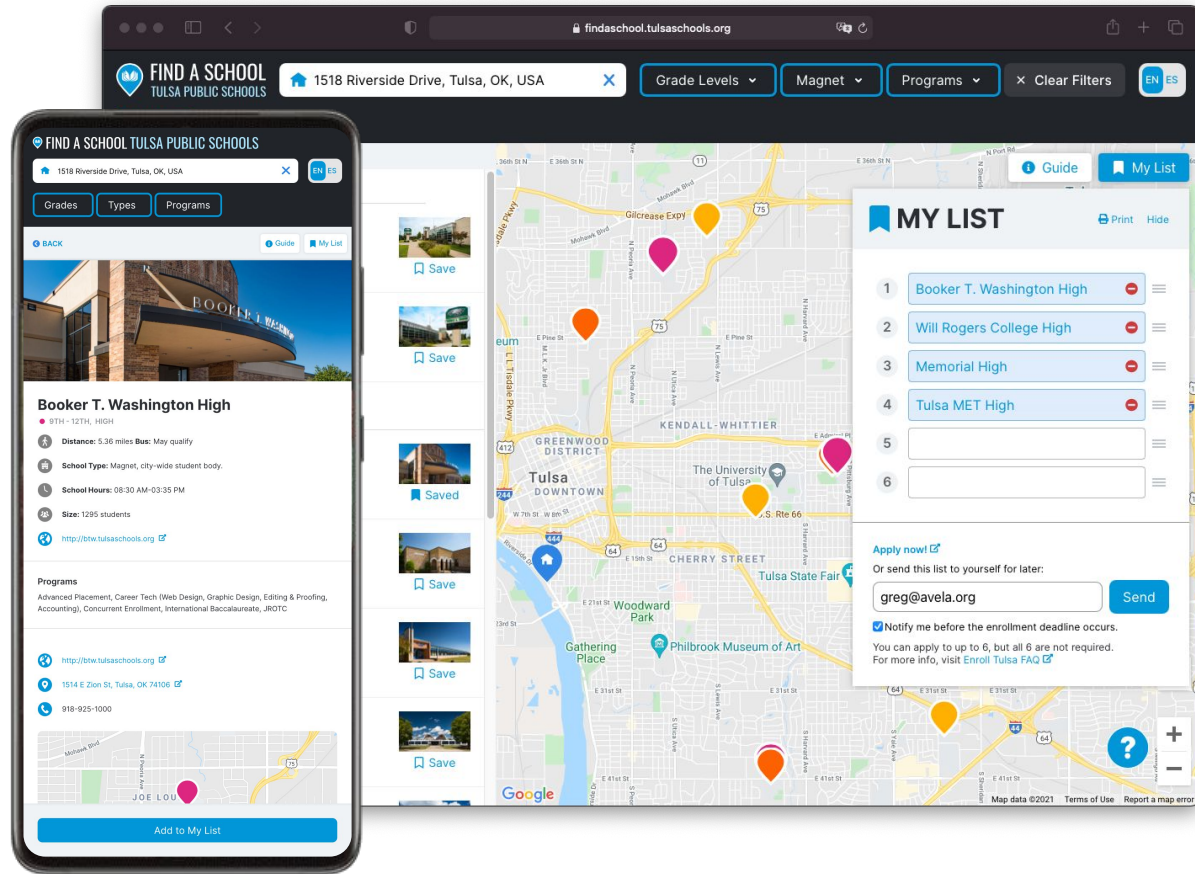
- Filters, No Wizard!

- **Recommendations**

- Encourages Ranking
- Eligibility
- Neighborhood Schools
- Commute Distance
- Similar Schools

- **School Profile Information**

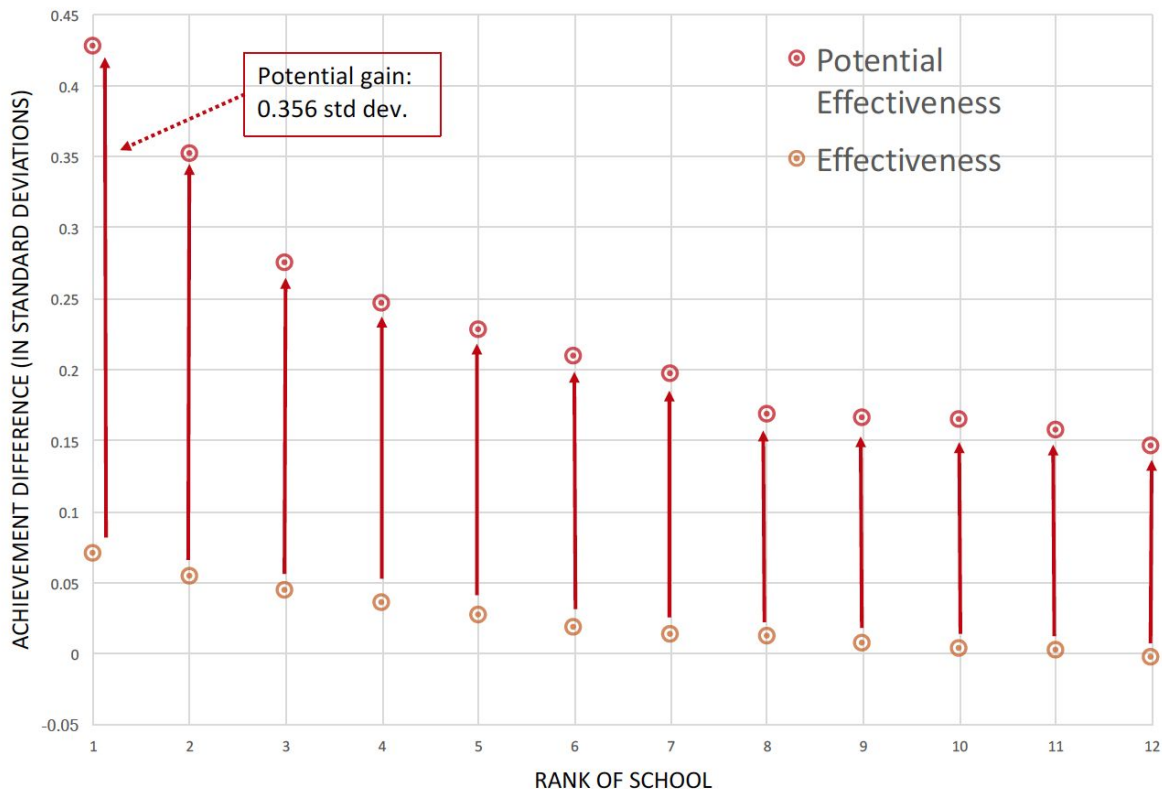
- **Connects to Application**



Making Better Choices



Characteristics of Choices in NYC (Net of Distance)



RECOMMENDATION:

Use the Power of the Algorithm

Power of the Algorithm



- **Algorithm**: takes inputs into outputs
 - Inputs: student preferences and admissions priorities
 - Outputs: offers of school assignments
- Even the best algorithm cannot create new seats
 - Algorithm should be seen as tool to implement policy goals
- Data from algorithm can be used to generate continuous improvement feedback loop
 - Where is there unmet demand? Where should we target outreach?
 - What ifs?
 - What if we expanded school capacity?
 - What if we changed the admissions priority
 - Scenario planning using historical data



Plans upend Boston school assignments

Two of 5 would scrap geographic attendance in favor of neighborhoods

By James Vaznis and Travis Andersen | GLOBE STAFF SEPTEMBER 25, 2012

ARTICLE PREVIEW GRAPHIC VIDEO COMMENTS (5) SUBSCRIBE

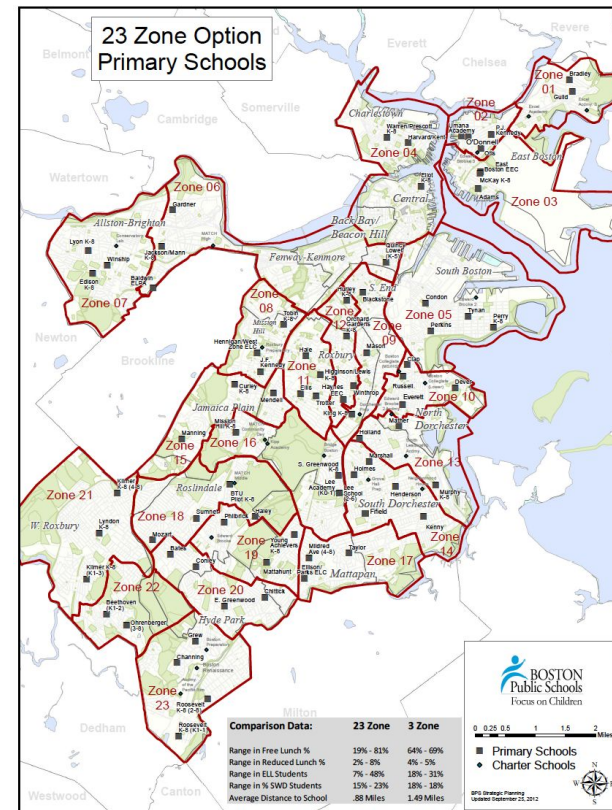
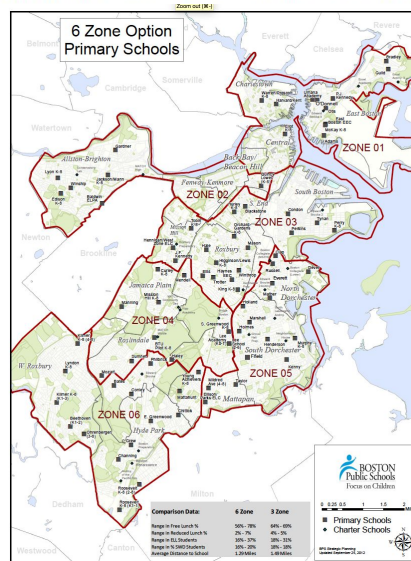
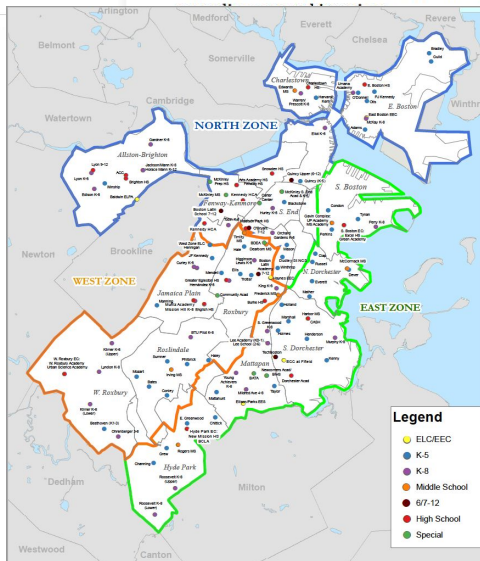
Boston school officials Monday night presented five proposals for assigning students to schools that would carve up the city into as many as 23 attendance regions. The other proposals would divide the city into either six, nine, or 11 zones. A fifth plan has no zones and would attempt to let students attend a school closest to their home. The proposals represent a big departure from the city's 23-year-old system of assigning students to schools, which chops up the city into three

In this section
Metro

Mashpee tribe, Mass. agree on new terms for casino

Tips pour in on Gardner Museum art theft

Boy Scouts a surprise success in Boston



Simulating Effects of Redrawing Zones



The Boston Globe

Metro

Search

NEWS METRO ARTS BUSINESS SPORTS OPINION LIFESTYLE MAGAZINE INSIDERS TODAY'S PAPER MY SAVED

LOTTERY OBITUARIES GLOBE NORTH GLOBE SOUTH GLOBE WEST GETTING IN

MIT has plan for Boston school assignments

By [James Vaznis](#) | GLOBE STAFF | OCTOBER 28, 2012

ARTICLE COMMENTS (5) SUBSCRIBE

PRINT REPRINTS E-MAIL SHARE

A new proposal for Boston school assignments presented Saturday by a Massachusetts Institute of Technology doctoral student was essentially pushed to front-runner status by an advisory committee, as five other proposals began to fall off the table, just one month after they were unveiled.

The [External Advisory Committee](#), appointed by the mayor, heard a presentation on the MIT proposal for the first time during a meeting Saturday morning at City Hall. Several members said it showed the greatest potential of providing equitable access to the city's limited number of quality schools, as the panel seeks to create a student-assignment system that allows more students to attend schools closer to their homes.

A key challenge in overhauling the current system, which provides students a wide range of school choices, has been a troubling reality: Long after Boston's period of busing students, the system continues to be unfair, with many students attending schools that are lackluster or failing, typically located in impoverished areas, while others go to better ones.

Under the proposal developed by Peng Shi of MIT's Operations Research Center, Boston would scrap its 23-year-old student-assignment system that divides the city's schools into three sprawling geographic zones. Instead, a computerized system would simply generate a choice of at least four schools near a family's home.

In this section

Metro

Mashpee tribe, Mass. agree on new terms for casino

Tips pour in on Gardner Museum art theft

Boy Scouts a surprise success in Boston

Air files on Internet activist's case, father asks

'Rockefeller' said to have been seen digging in yard

Middlesex DA will leave office next month

Middlesex DA Leone to step down, join Boston law firm

Shake Shack's local fans await a burger bash

Power of the Algorithm: Honesty is Best Policy



- Recommendation: Make strategy-proof
 - Eliminate “gaming”:
 - Honesty is the best policy
 - Can give simple advice to participants
 - Levels the playing field
 - Data become more reliable

The New York Times

How Game Theory Helped Improve New York City's High School Application Process

By Tracy Tullis

Dec. 5, 2014



Tuesday was the deadline for eighth graders in New York City to submit applications to secure a spot at one of 426 public high schools. After months of school tours and tests, auditions and interviews, 75,000 students have entrusted their choices to a computer program that will arrange their school assignments for the coming year. The weeks of research and deliberation will be reduced to a fraction of a second of mathematical calculation: In just a couple of hours, all the sorting for the Class of 2019 will be finished.

STUDENT	SCHOOL PREFERENCES	1			2			3		
		ABCD	EFGD	ADHI	ABCD	EFGD	ADHI	ABCD	EFGD	ADHI
A	1 2 3	✓			✓			✓		
B	2 1		✗		✓			✓		
C	1 3 2	✓			✓			✓		
D	1 3 2	✓			✗					✓
E	3 2 1			✗		✓			✓	
F	1 2	✗				✓			✓	
G	1 3 2	✗					✗		✓	
H	3 2			✓			✓			✓
I	1 2 3	✗				✗				✓
J	2 1 3		✗		✗					✗

Algorithm can be Replicated



- Recommendation: Ensure Audibility and Transparency
 - Across entire system
 - Audit the data that is used to generate school matches, as well as the matches themselves
 - Keep track of lottery numbers and other tie-breakers
 - Engage an independent organization to increase credibility

D.C. Politics

D.C. Public Schools leader to resign after skirting school assignment rules



D.C. Public Schools Chancellor Antwan Wilson during a visit to Washington Metropolitan High School this fall. (Astrid Riecker/For The Washington Post)

By Perry Stein, Peter Jamison and Fenit Nirappil

Feb. 20, 2018 at 7:45 p.m. EST



D.C. Public Schools Chancellor Antwan Wilson, appointed last year with a mandate to close a persistent student achievement gap, was forced to resign Tuesday amid revelations he skirted the city's competitive lottery system so his

WOLF SUB-ZERO CREATIVE GROUP
Imagine a kitchen that combines elegant design...
GET STARTED



Agenda

Introductions

Enrollment as Allocation Problem

Centralize, Streamline, and Simplify

Q&A and Discussion

Questions?

Parag Pathak
parag@avela.org



JOIN OUR NEXT WEBINAR:

Assignment Algorithms and the Science of Matching

What you need to know to run equitable,
transparent enrollment lotteries.

August 26, 2021 - 11:00am PT / 2:00pm ET

Register @ <https://avela.org/webinar>

