

FEBRUARY 2023

WHARTON PEOPLE ANALYTICS

CASE COMPETITION

PREPARED AND PRESENTED BY

TEAM DATA DRIVEN DECISIONS

PROJECT DESCRIPTION

The project aims to analyze Teach for America's admissions process to identify factors that can reduce the dropout rates of their participants.

We studied the existing literature to understand the context and then identify key variables that distinguish the candidates who complete the program from those who drop out.

The analysis was conducted from a behavioral lens to understand the factors that impact corps completion.

Finally, we suggest low-cost actionable insights that can be implemented to reduce the dropout rates and improve the quality of the admitted candidates.

After conducting an initial data analysis, a disconcerting revelation emerged; an overwhelming 90% of individuals who apply to the Teach for America (TFA) program are unable to complete or drop out during the rigorous admissions process. In fact, only 7% of applicants proceed to the first day of school, with a paltry 5% completing the demanding two-year commitment.

To better comprehend the distinctive traits and critical components of the 7% who successfully navigated TFA's stringent admission process and went on to complete the program. This strategic focus aims to shed light on the pivotal factors that drive retention and enable success within the organization.

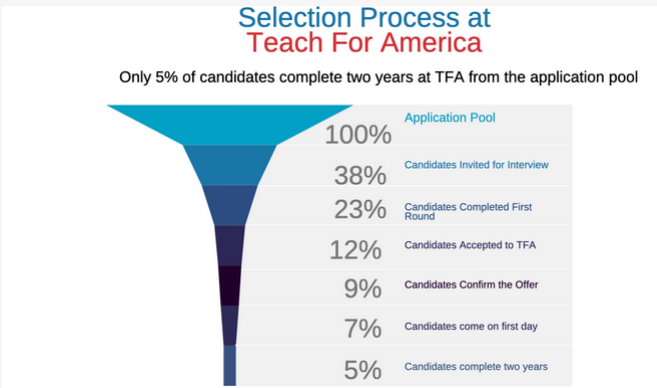


Figure1: TFA's Candidate Funnel: Showing how the application process works and that ultimately only 5% people complete the 2-year program

FINDINGS

We conducted a comprehensive analysis of a TFA candidate's journey map to identify critical touch-points. The intent was to gain a deep understanding of the multifarious factors that shape a candidate's experience and influence their decision-making process. By mapping out the various stages of the candidate's journey and investigating the numerous points of interaction, we sought to identify potential areas of improvement that could enhance the overall experience and improve retention.

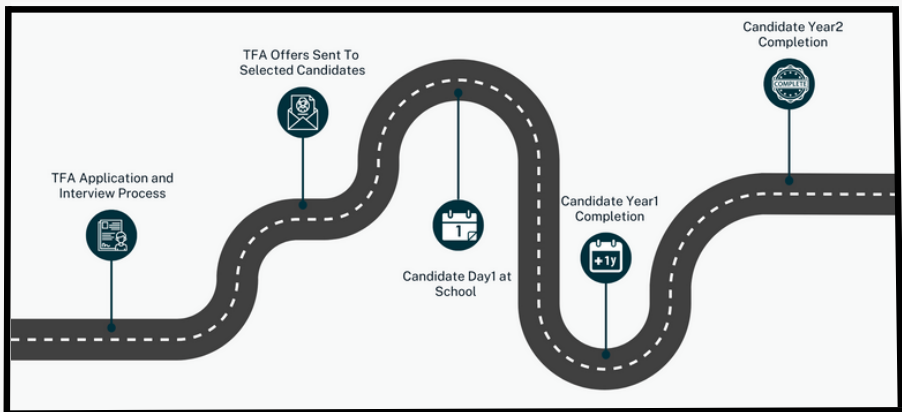


Figure2: TFA Candidate Journey Map

Building on our in-depth analysis of the Teach for America (TFA) candidate journey, we leveraged a logistic regression model (model accuracy 81.5%) to identify the crucial parameters that shape the experience of candidates who are recruited and subsequently attend day one. By scrutinizing a plethora of factors, including the characteristics and behaviors of the successful candidates, we aimed to discern the essential determinants that facilitate retention and program completion.

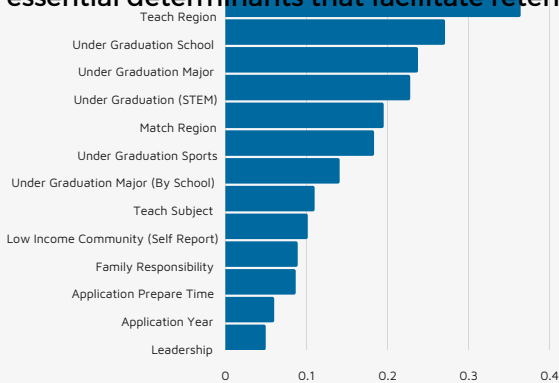


Figure3: TFA First Day Variables

Key Findings for Day1 Arrival



FINDINGS

CERTAIN REGIONS SUCH AS **NYC, BAYAREA, BOSTON, AND MEMPHIS**, EXHIBIT A GROWING DISPARITY BETWEEN THE NUMBER OF CANDIDATES WHO TURN UP FOR DAY ONE VERSUS THOSE WHO DO NOT, THUS EMPHASIZING THE **IMPACT OF THE CANDIDATE'S LOCATION**.

CANDIDATES HAILING FROM SPECIFIC **UG SCHOOLS, MAJOR GROUPS**, AND PARTICULARLY **NON-STEM DISCIPLINES**, MANIFEST A HIGHER LIKELIHOOD OF ATTENDING DAY ONE, INDICATING THAT THE **CANDIDATE'S EDUCATIONAL BACKGROUND HAS A SIGNIFICANT INFLUENCE** ON THEIR DECISION TO PARTICIPATE.

To delve further into the characteristics of candidates who successfully complete TFA’s two-year program, we utilized XGBoost, a machine learning algorithm that employs an ensemble of decision trees to predict outcomes while optimizing a gradient boosting objective (Accuracy: 75.8%; Precision: 0.81; Recall: 0.75; F1 score: 0.75). These metrics reveal the strong predictive power of the XGBoost model in determining which candidates are most likely to complete the TFA program. Utilizing both our XGBoost machine learning model and comprehensive literature review, we have successfully extracted the paramount parameters of individuals who have completed the two-year tenure.

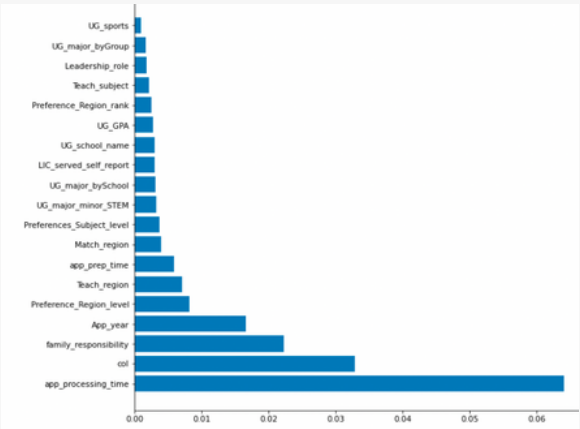


Figure4: TFA year2 completion variables

Key Findings for 2-year Completion



Non-conductive
work environment



Cost of Living



Application
process time



Low
incentive for
work



Family
Responsibility

FINDINGS

We further analyzed region wise data to apprehend the intricate dynamics of regional cost of living which was found to be crucial factors according to our earlier analysis.

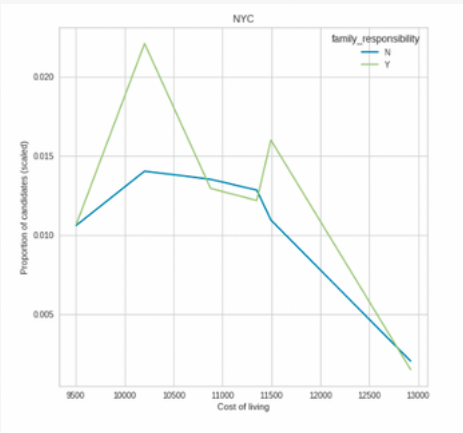


Figure5: Candidates vs Cost of Living at NYC

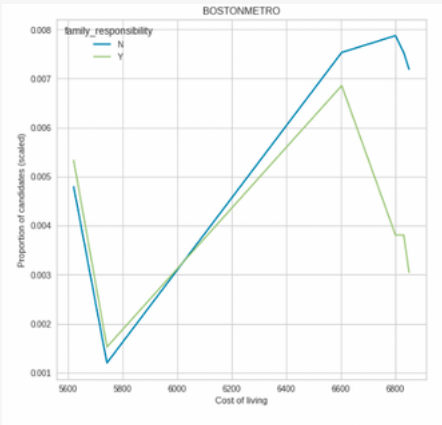


Figure6: Candidates vs Cost of Living at Boston

Our findings reveal that the rates of dropout among TFA candidates vary based on multiple factors such as year, region, and cost of living, particularly for individuals with different family responsibilities.

On looking at the top five TFA regions, those with the highest application numbers, uncovered a range of diverse patterns. For example, in New York City, participants with family responsibilities exhibit higher dropout rates than those without, but this trend diminishes with increasing cost of living over the years. Conversely, in Boston, dropout rates have amplified with the rising cost of living over time, with more individuals without family responsibilities leaving the program.

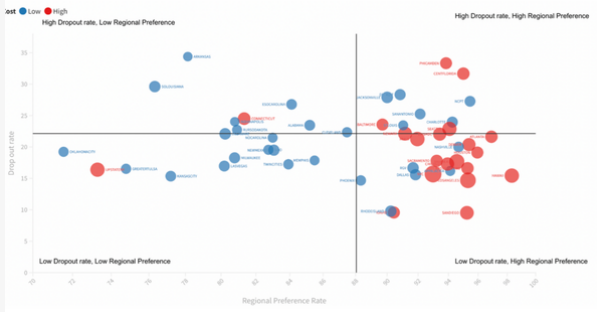


Figure7: Regional Preference vs Dropout Rate (size of the bubbles indicating the average cost of living)

We highlight regions with high attrition rates and regional preferences. Our analysis suggests that TFA should focus their efforts on the upper-left quadrant (Quadrant 1) to address the notable attrition rate despite participants receiving their preferred choice, potentially enhancing participant retention via targeted interventions.

RECOMMENDATIONS

**WE SUGGEST HABIT FORMATION,
INCREASING ENGAGEMENT AND
ALTERING THE INCENTIVE STRUCTURE**

HABIT FORMATION

- People avoid or fear doing bigger complex tasks, **making it easy for them by breaking down the complex task** of completing 2 years into smaller, simpler actions such as 3 or 6 month milestones or basically smaller achievements that people look forward to and feel motivated to accomplish and in the process, complete the overall goal.
- **Prompt people when they are more receptive** as they are more likely to change behavior during this period. The waiting period between application and interview rounds, can be used to send out reminders and follow-up to candidates as they wait to hear back from TFA and other organizations as it will help in anchoring them.
- **Help people plan their response to most commonly arising problems or issues** based on feedback from previous candidates and the strengths and weaknesses of the current candidate as being prepared in advance will make them feel supported and will better equip them to deal with the situation.
- **Encourage public commitments using social norms** such as in group settings or on social media, where others can see and support their commitments. This can create a sense of accountability and motivate candidates to stick to their commitments.

RECOMMENDATIONS

ENGAGEMENT

- **Building a community** around the local work and teams in each region can create a sense of belonging. Connecting candidates with similar interests and hobbies with each other and candidates from previous years can assist in this.
- **Harnessing power of networks and collective action** by leveraging expertise and knowledge of the candidates in specific areas and working together with the internal TFA team and the external school team where the candidates are posted.
- **Mutual support and spreading peer-to-peer behavior** through seminars and trainings, mentoring sessions and job rotations (as applicable) which also increases social connections which is a strong motivator.
- **Encouraging people to make commitments together** and to each other within the team/community such as how people will celebrate their milestone achievements or two-year completions with specific dates, days and plans; group countdowns as the team approaches any major milestone or meets important deadlines such as exam and project evaluations as this will create accountability among team members.
- Alumni connect can be useful by having pictures and videos of candidates or alums teaching students and working with them with quotes or **testimonial videos about how and why they loved the experience**; this will not only act as social proof by increasing behavioral observability but will also facilitate social learning.

RECOMMENDATIONS

INCENTIVE STRUCTURE

- Try **non-monetary incentives** such as change in titles and/or smaller promotions, badges for social media and otherwise, recognition and praise, autonomy to make certain minor work decisions to give a sense of control and ownership
- **Periodic reminders of the overarching purpose** or goal of making a meaningful contribution to the society by leveraging positive emotions and personalized messaging

ADDITIONAL SUGGESTIONS

Additionally, we conducted **k-means clustering** to identify segments. However, discerning precise inferences and formulating recommendations necessitates further data and analysis to augment our current insights.

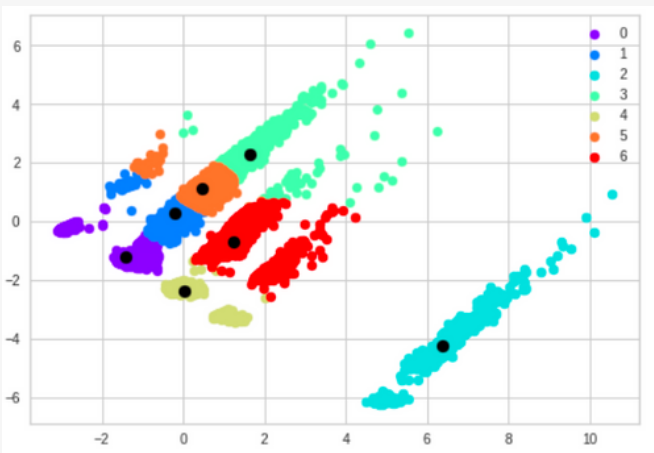


Figure7: Clusters from K-Means Clustering Analysis

ADDITIONAL SUGGESTIONS

We also identified a few additional variables that would help better understand these segments:

0. Commitment variable: based on the reason the candidate wants to join TFA

We have the following assumptions:

- Having a similar background in terms of income, pell grants, education and family responsibilities could result in candidates completing the 2 year program [Quote: "I'm from Mississippi, and I honestly felt like I wouldn't have had any passion for teaching had I done it somewhere else, or if I wasn't teaching black kids"¹]
- Data on the commitment variable basically the candidate's reason to work for TFA will help refine and streamline the selection criteria and interview process

2. Performance variable: based on the candidates' performance as teachers during their time at TFA

We have the following assumptions:

- Candidates performing well get burnt out quickly and drop out before 2 years
- Candidates not performing well are unable to cope with the work and drop out before 2 years
- More data on the performance variable will help us understand the actual reason and can design interventions to address the issue.

0. Mannie, S. (2020, October 21). Can teach for america get more teachers to stick around in some of the nation's poorest schools? The Hechinger Report. Retrieved February 18, 2023, from <https://hechingerreport.org/can-teach-for-america-get-more-teachers-to-stick-around-in-some-of-the-nations-poorest-schools/>

SUGGESTIONS

3. Opportunity cost variable: based on the resources at each candidates' disposal. In this specific context, resources are defined in terms of GPA, college selectivity, career level, other job opportunities/career choices available, etc.

We have the following assumptions:

- The resource deficit/ people with lower alternatives will stick around longer
- The resource rich/ people with more alternatives will not stick around for a long time
- Data on the opportunity cost variable will help us determine how candidates are evaluating their offer from TFA and refine the interview criteria and process.

To identify who to interview, we calculated candidate-to-candidate similarity scores:

- We recommend a candidate similarity algorithm, inspired by collaborative filtering which is a Machine Learning algorithm that predicts a person's interests by modeling preferences and behavior information of others like them.
- Our algorithm outputs a list of candidates, most similar to the successful candidates of previous years. TFA can select top n from the above list where n is based on previous drop off between number of candidates interviewed and number of candidates who completed 2 years.