

2-7-2024

The Delta Program: Bringing Change Through Mathematics

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Recommended Citation

Ndiaye, Ndeye F., "The Delta Program: Bringing Change Through Mathematics" (2024). *CAFE Symposium 2024*. 3.

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The Delta Program: Bringing Change Through Mathematics

Abstract

This action plan elaborated in class has the goal of presenting the implementation steps of the Delta Program. The Delta Program is a mathematics preparatory course targeting low-income 12th-grade students who will take the ENEM exam, the main college entry exam in Brazil. It aims to dissect the mathematics section of the exam and help students maximize their punctuation through problem-resolution-based classes.

Keywords

ENEM, math, brazilian education, prep course, university

Disciplines

Education Policy | Public Affairs, Public Policy and Public Administration

Comments

This poster was created based on work completed for FYS 108: Change and Agency Through Activism, and presented as a part of the ninth annual CAFE Symposium on February 7, 2024.

THE DELTA PROGRAM: BRINGING CHANGE THROUGH MATHEMATICS

BY: FATOU NDIAYE '27

FYS 108: CHANGE AND AGENCY THROUGH ACTIVISM

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SUMMARY

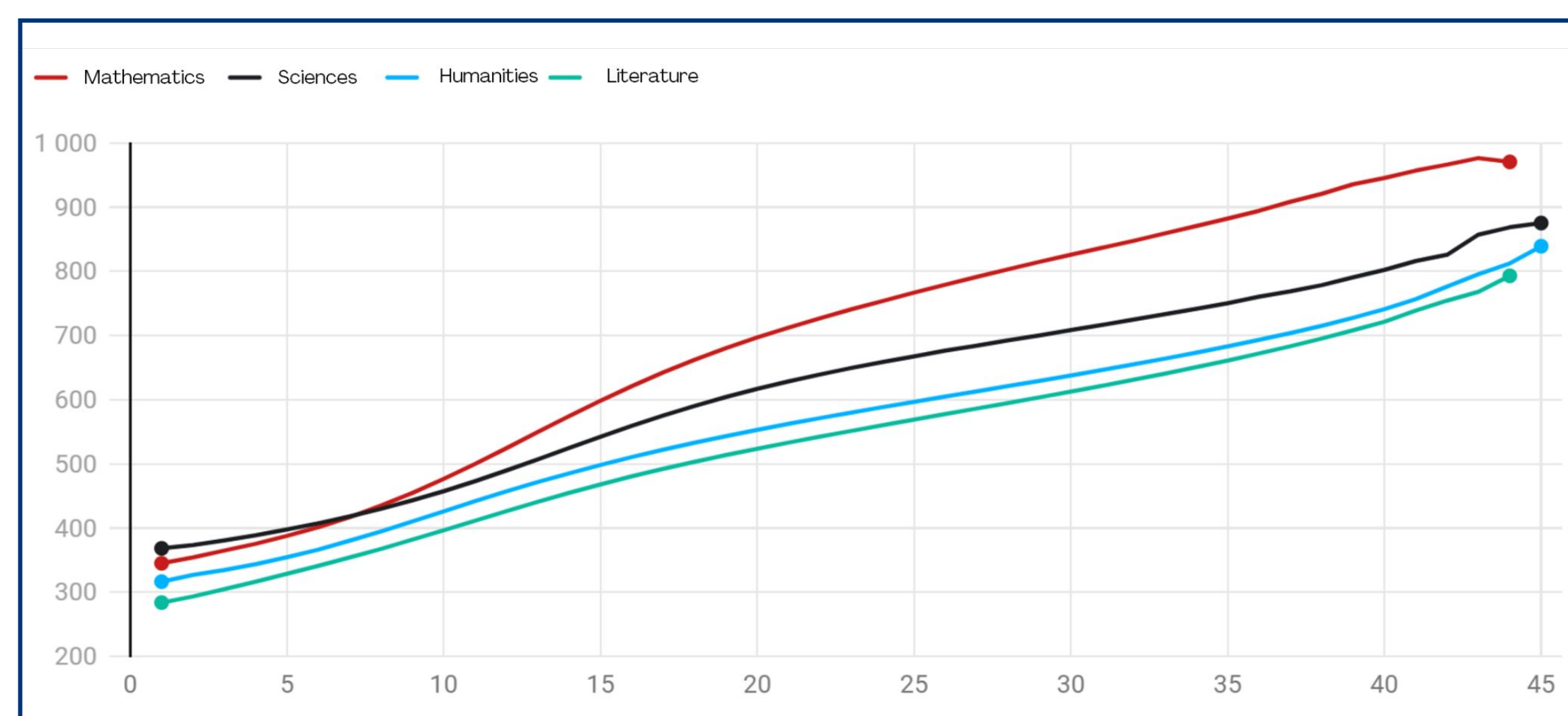
This action plan elaborated in class has the goal of presenting the implementation steps of the Delta Program. The Delta Program is a mathematics preparatory course targeting low-income 12th-grade students who will take the ENEM exam, the main college entry exam in Brazil. It aims to dissect the mathematics section of the exam and help students maximize their punctuation through problem-resolution-based classes.

CONTEXT

- The ENEM exam is the main mean to access university and is composed of 180 questions equally divided into 5 sections: Essay, Literature, Humanities, Natural Sciences and Mathematics.
- Out of all Brazilian public school students, 95% graduate without adequate mathematical knowledge.
- For assessment, the exam utilizes Item Response Theory, which uses three parameters such as degree of difficulty and possibility of getting a question right by chance. Questions have individual scores and the mathematics area is considered easier.
- Between accepted students, 62% do some form of preparatory course. The average cost of a course is US\$ 109.00 per month, 41% of the Brazilian minimum wage.

INTERVIEWS & RESEARCH

- Professor Andre Novaes: Professor Andre Novaes is a mathematics instructor at the Rio State University Teachers College. He taught math for more than 15 years in the public and private school systems. The main takeaways of the interview were (1) many students don't see the value of a college education; (2) there is a systematic math deficiency in the public school system; (3) students need to create the habit of training questions; (4) students oftentimes do not feel motivated in class.
- Dr. Daniela Caldas: Dr. Daniela Caldas has a Ph.D. in Neuroscience. She is an educational mentor for three ENEM preparatory courses. The main takeaways of the interview were (1) students must be strategic during the preparation process, targeting the most recurrent topics; (2) students must maintain healthy habits outside the classroom; and (3) students must feel like they are the protagonist of the process to maintain engagement.
- Pedro David (student): Pedro is a prospective cinema and media studies major. He took the ENEM exam in his junior year (2022) and his senior year (2023). The main takeaways of the interview were: (1) students have a difficult time structuring their schedule; (2) the exam is a very tiring experience; (3) the preparation done at his school was not sufficient.



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TARGET AUDIENCE



Sourced by; Ovidio Mota (2015).

The Delta Program will first be implemented at the Integrated Center for Public Education 326 (ICPE 326). The ICPE 326 is located in the favela Complexo da Mare, in the Northern region of Rio de Janeiro. The average class size is 284 students and the average score on the mathematics section of the ENEM exam is 480.14, 11.53% higher than the national mean score.

STRUCTURE

The program will be held throughout the academic year (February-November), once a week on Saturdays. Acknowledging the ICEP class schedule, it would not be predictive to hold the program on a weekday considering that students have to attend class. By organizing on Saturdays, it is possible to achieve higher productivity and attendance. Between the classes, students will have breaks and the opportunity to do cultural and wellness activities (read section 7 for more information on those). The sample daily schedule of the program goes as follows:

Time	Activity
9:00 - 9:50 am	Breakfast
10:00 - 12:30 PM	Class
12:30 - 1:30 pm	Lunch
1:30 - 3:30 pm	Class
3:30 - 4:30 pm	Break/Wellness Activities
4:30 - 5:30 pm	Class
5:30 - 7:00 pm	Cultural Activities

PHYSICAL RESOURCES

The Delta Program will be held at the Technology Center (TC) of the Federal University of Rio de Janeiro (UFRJ, acronym in Portuguese). The UFRJ was founded in 1920 and it is the largest university in the country, with a student body of more than 65K students. According to Article 16 of Law 9394, all federal universities are considered public spaces, allowing the Delta Program to be offered approximately half a mile away from the target school



Sourced by: Omar Uran (2009)

HUMAN RESOURCES

The classes will be offered by mathematics undergraduate students from the UFRJ, specifically those following the teaching concentration within the major. By having students as instructors, the program: (1) reduces costs, since it is much cheaper to hire students than professors; (2) creates a collaborative environment, and students feel more comfortable asking questions to college students (Li et al. 2022); (3) college students also benefit from the experience, having the opportunity to have classroom experience before graduation.

MARKETING STRATEGIES

Accounting that the Delta Program targets an audience of a specific school, most communication will use the school communication channels, which include: (1) in-classroom announcements by professors; (2) posters in all 12-grade classrooms; (3) school official communications, including newsletters, email chains, and WhatsApp groups. The Delta Program will have an official Instagram page as a way to communicate announcements to the students and to share more about the development of the program throughout the year, to attract more students and private funding in the following academic cycles.

BUDGET AND FUNDING

The Delta Program is eligible to be financed by the Rio de Janeiro Education Secretary Award for educational projects. The funding allows for the establishment of projects targeting public school students from K-12. Beyond public funding, the Delta Program could get funded by private initiatives such as the awards for educational projects offered by the EDP Institute, the MRV Institute, and the Ibi Foundation. The expected monthly cost to run the program is US\$ 36,00.

CLASS PLAN

- First, to enter the program, all students must complete a mock exam, then students will be divided into three levels according to their score:
- The classes will be problem resolution based. The ENEM has a very particular question style, as giving students the ability to practice and familiarize themselves with the exam is the most effective way to improve their scores in the short run (Santos 2017).
- Each class will have three instructors, a main instructor, who will solve the questions, and two other instructors to assist students with the questions during the class, on an individual basis
- The first class of the month will always be a mock test. That ensures that students have the opportunity to practice question resolution in exam conditions and also measure the development of students to assess the effectiveness of the program and analyze areas for improvement.

BEYOND THE CLASSROOM

The ENEM Exam can be mentally exhausting to most students, not only due to the intense preparation that the exam requires but also due to the pressure to perform well. Investing in psychological and wellness support ensures that students maintain their mental health during the preparation. The first wellness pillar of the program is ensuring that students are well nourished. Accounting for their socio demographic profile, it is reasonable to infer that food insecurity could be a potential challenge to many students. By providing meals, students can better concentrate during the classes. During the breaks, the Delta Program will offer wellness activities, such as sports, arts and crafts, and other opportunities to discuss career, mental health, and exam preparations.

POINTS OF CONTENTION

- Classroom engagement: One challenge that the program might face is low classroom engagement.
- Quality of the classes: Another relevant point to consider is how the Delta Program can ensure that students are receiving the best training possible, acknowledging that the instructors are college students.
- Lack of mathematical foundations: There is a systemic component to the issue, with several students completing high school without proper knowledge of mathematics.

ACKNOWLEDGEMENTS

- Dr. Anne Douds for her mentorship as professor and advisor;
- Librarian Kevin Moore for his assistance with research;
- Dr. Caldas, Professor Novaes and Pedro for the interviews;
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