HARVARD Online

Big Data for Social Good

Syllabus

Big Data for Social Good will teach you how to use big data, coupled with the tools of data science and economics, to solve some of the most important social problems of our time. Big data can help us cut through politically charged debates and find out what policies actually work from a scientific perspective, making the often-discussed notion of "evidence-based policymaking" a reality. Using big data, we can see how the specific neighborhoods in which we grow up and the schools we attend shape our life outcomes—and how we can take these insights to create better opportunities for all.

Modules		Case Studies	Takeaways	Key Exercises
Module 1	**The Geography of Upward Mobility**	• The Opportunity Atlas • Brownsville, Brooklyn	• Recognize some of the statistical techniques used to measure and map opportunity • Explore granular variation in levels of upward mobility across places	• Identify different sources of big data • Explore linear regression • Use the Opportunity Atlas to examine patterns across
Module 2	**Causal Effects of Neighborhoods**	• Moving to Opportunity Experiment	• Consider ethical and policy considerations in social science experiments • Understand the design and uses of randomized controlled trials • Explore two methods for causal inference: experiments and quasiexperiments • Interpret methods for establishing statistical significance • Recognize the importance of randomization in experimental design	• Identify scenarios that best demonstrate causal relationships • Explain the difference between sorting and causal effects • Test whether randomization has been successful at assigning for experimental groups • Adjust for non-compliance in calculating treatment effects • Assess whether or not experimental results are statistically significant
Module 3	**Characteristics of high mobility areas and policies to Increase Upward Mobility**	• Creating Moves to Opportunity • Harlem Children's Zone	• Describe the factors that are correlated with differences in upward mobility across places • Understand the relationship between supply and demand • Explain the distinction between constraints and barrier	• Identify characteristics of high mobility places • Explore the history, design, and findings from the Creating Moves to Opportunity Experiment • Explore place-based investment as a method for increasing upward mobility for children

Modules		Case Studies	Takeaways	Key Exercises
Module 4	**Historical and International Evidence on the Drivers of Inequality and Mobility**	• The American Dream • Social Capital	• Describe how changes in GDP growth and inequality have affected absolute mobility over time • Understand the concept of social capital • Understand how economic policies can "pay for themselves" in the long term • Identify different statistical approaches to measuring upward mobility • Investigate both redistributive policies and policies that invest in human capital	• Compare upward mobility in the US to other countries • Hypothesize potential causes of the 'Fading American Dream' • Predict levels of upward mobility historically • Calculate the net cost of economic policies
Module 5	**Upward Mobility, Innovation, and Growth**	• The Effect of Mentorship	• Explain the relationship between economic growth and equality of opportunity • Identify data sources for studying innovation • Explore innovation as a potential path for increasing both equality of opportunity and economic growth • Understand how to use propensity score reweighting	• Consider the role of mentoring in your own life • Describe differences between endowments, constraints, and preferences and consider which factor contributes most to inequality among innovators • Utilize propensity score reweighting to explore the gap in innovation rates between highand low-income children
Module 6	**Higher Education and Upward Mobility**	• College Mobility Rates	• Explore the extent to which colleges and universities in the US either promote or hinder upward mobility • Understand how to measure the causal effect of college on a student's outcomes • Recognize the importance of both access and outcomes in determining a college's Mobility Rate	• Utilize a production function framework to explore the relationship between college attendance and future earnings • Describe a counterfactual simulation • Identify ways to measure the causal effect of colleges on students' earnings

Modules		Case Studies	Takeaways	Key Exercises
Module 7	**K-12 Education**	• Education and Student Outcomes	• Understand methods for standardizing data from across different sources • Study the importance of class size and teacher quality in determining students' outcomes	• Interpret results from a regression discontinuity model • Interpret results from an event study model
Module 8	**Racial Disparities in Economic Opportunity**	• Historical Roots of Racial and Ethnic Inequality	• Understand dynamic models and steady states • Explore differences in upward mobility by race/ethnicity and gender • Explain that differences in upward mobility lead to the persistence of mobility gaps in "steady state"	• Interpret steady state models • Propose policies for addressing racial disparities

Learning requirements: In order to earn a Certificate of Completion from Harvard Online and Harvard Business School Online, participants must thoughtfully complete all 8 modules, including satisfactory completion of the associated quizzes, by stated deadlines.