How can we critically assess the data, models, and numbers used in making policy and hold to account those with the power to produce them?

M/W/(F) 10:30-11:45 AM, Location: Harvard Hall 201

Please CHECK OUT THE ASSIGNMENTS for final presentations!

Instructors: Sheila Jasanoff (sheila_jasanoff@harvard.edu); OH: T/B/A; and by appointment

Sam Weiss Evans (samuel_evans@harvard.edu); OH: M-W 2-4pm (book here); and by appointment

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Course Description

The ability to critically assess numbers, data and models and hold to account those with the power to generate them is a vital capability for every 21st-century citizen. This course will give you an increased understanding of how important ethical and political perspectives enter into the design of the techniques of enumerating, data gathering and modeling that structure our individual and collective lives.

Quantitative reasoning helps us make sense of a rapidly changing social, technical, and scientific landscape. The course will introduce you to concepts and methods that can be used to analyze the complex relationships between quantification and its social contexts, and to understand how those insights are incorporated into decision-making. You will learn how data, quantitative methods, and modeling inform public and private decisions in areas including social classification, risk assessment, climate change, and crisis responses, such as pandemic management. We will consider how assessments of uncertainty, probability, and risk are embedded within prior social understandings of equality, fairness, and democracy. Class exercises are designed as hands-on attempts to fit quantitative reasoning to those understandings. In particular, students will learn how to bring democratic values to bear on the quantitative assessment of social problems and policy approaches.

Course Logistics

Conceptual tools: the â€œCrib Sheetâ€

The course introduces students to key concepts from Science and Technology Studies (STS) that are used to analyze the issues for policy and society raised by the pervasive uses of numbers, data and models. These concepts provide an entry point to serious interdisciplinary engagement with the social problems of quantification rather than a comprehensive theoretical introduction to any single discipline. Cross-cutting concepts are introduced in the first week. Succeeding weeks feature additional concepts for deeper engagement, academic analysis, and application to â€œblack boxâ€ exercises. Go to the Crib sheet.

Readings

Required readings will be posted to the course website for each class session. Please let the teaching staff know immediately if any readings are missing or hard to access.

Additional Reference Works

Course heads will provide additional suggested readings to help you prepare your final projects.

Course Format

We will meet in lecture format twice each week and hold weekly sections with required attendance.

Requirements & Grading

Attendance and class participation	20%
Bi-weekly creative exercises	30% (6% each, max. 300 words)
Midterm project development	20% (3-5 page proposal, with references)
Final Project and In-Class Presentation	30% (8-10 page paper or other product)

Academic Integrity

Students are expected to abide by Harvard University rules regarding appropriate citation of sources. Failure to cite material written by others is considered a violation of University policy and will lead to disciplinary action. This action may include a failing grade in the course, failure to graduate, and even expulsion from the University.

Accommodations

Harvard University is committed to providing students who have disabilities with equal access to all instructional resources through inclusive design and the provision of reasonable accommodations. Students approved for accommodations should contact the teaching staff to discuss elements of the course that may be inaccessible and develop a plan together on how their accommodations will be implemented, based on their letter from AEO. We encourage students needing accommodations to inform the teaching staff about their individual needs as soon as possible. For further information and making accommodation requests, please visit the AEO website.

Attendance

Attendance is required in all Gen Ed courses. As such, Gen Ed courses are not eligible for course-wide simultaneous enrollment waivers. Students pursuing simultaneous enrollment in a Gen Ed course and a non-Gen Ed course must attend the Gen Ed course.

Covid-19 policies:

- If you are a â€œclose contactâ€ as defined by university policies, and are fully vaccinated and have no symptoms, you should attend class as usual.
- If you have tested positive, inform the instructors and stay home.
- If you have symptoms, inform the instructors and stay home.

SYLLABUS â€“ GenEd 1173 (Spring 2022)

Introduction: Meaningful and Meaningless Numbers

Monday, January 24: Course Overview (Jasanoff & Evans)

Explanation of course aims, requirements, and expected outcomes; purpose of sections, readings, and assignments; relationship to GenEd category â€œScience and Technology in Societyâ€ and field of STS.

J. Herman, A Short History of Predicting the Future. *New York Times*, November 23, 2021. [PDF]

J. Palca, Math Can Help In Deciding How To Distribute The Vaccine. Weekend Edition Sunday. NPR. (4 minutes)

Wednesday, January 26: Introduction to the â€œCrib Sheetâ€ (Jasanoff & Evans)

Introduction to the â€œcrib sheet,â€ core concepts; examples from COVID-19

Crib sheet [SKIM]

D. Stone (2020) â€œThereâ€™s No Such Thing as a Raw Number.â€ In: *Counting: How We Use Numbers to Decide What Matters*, pp. 1-32, New York, Liverlight Publishing. [PDF]

T. Porter, Democracy counts: On sacred and debased numbers. [PDF]

[OPTIONAL] W. Espeland and M. Stevens (2008) A Sociology of Quantification. *European Journal of Sociology,* **49**(3):401-436. [PDF]

Module I: Data â€“ *How, what and whom do we count?*

Monday, January 31: Modern Numerology (Evans)

Origins of numeracy; from zero to orders of magnitude; the rise of the quantifying state and statistical thinking.

T. Porter (1988) â€œStatistics as Social Science.â€ In: *The Rise of Statistical Thinking, 1820-1900*, pp. 18-29, Princeton: Princeton University Press. [PDF]

J. Beck, Coincidences and the Meaning of Life. *The Atlantic*, February 23, 2016. [PDF]

C. Aschwanden, Science Isn't Broken. *FiveThirtyEight*, August 19, 2015. [PDF]

Exercise 0: Due Monday, January 31 by 5 PM

- 300 words self-introduction and on why youâ€™re interested in this course

Wednesday, February 2: The â€œNumerate Societyâ€ (Jasanoff)

De-naturalizing numeracy; constantly enumerating innumerable things; drowning in numbers.

G. C. Bowker and S. L. Star, Pure, Real and Rational *Numbers*: The *American Imaginary* of Countability, *Social Studies of Science* 31, 3, pp.422-425 (2001). [PDF]

M. Broussard (2018) â€œWhy Poor Schools Canâ€™t Win at Standardized Tests.â€ In: *Artificial Unintelligence: How Computers Misunderstand the World*, pp. 51-66, Cambridge: MIT Press. [PDF]

R. Zoglin, Weâ€™ve Become Obsessed With Statistical Probabilities, *Washington Post*, January 17, 2022. [PDF]

Monday, February 7: Constructing Data - What gets counted and what doesnâ€™t? (Evans)

Short introduction to data ethics in society; algorithmic bias; race, class, and gender

D. Stone (2020) â€œHow a Number Comes to Be.â€ In: *Counting: How We Use Numbers to Decide What Matters*, pp. 33-63, New York, Liverlight Publishing. [PDF]

K. Crawford (2021) â€œData.â€ In: *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*, pp. 98-121, New Haven: Yale University Press. [PDF]

A. Agoglio, â€œMissing Data: How the Exclusion of Female Subjects from Medical Research Hurts Science,â€ October 24, 2019. [PDF]

A. Galocha and B. Berkowitz, 500,000 coronavirus deaths visualized: A number almost too large to grasp, *Washington Post*, February 21, 2021. [PDF]

Wednesday, February 9: Census (boyd)

Systematically neglecting gender issues; not counting diseases of the poor; police shootings

d. boyd, Statistical Imaginaries: An Ode to Responsible Data Science. *Medium*, December 1, 2021. [PDF]

I. Hacking (1991) A Tradition of Natural Kinds. *Philosophical Studies* **61**(1/2):109-126. [PDF]

[LISTEN] Making Hispanics. Latino USA. NPR. (4 minutes)

Exercise 1: Due Wednesday, February 9 at 5 PM (confusing number)

- Find a confusing (false, misleading) number; explain (300 words) why it is confusing.

Monday, February 14: (Expert) Infrastructures (Jasanoff)

Data infrastructures in the pandemic and the questions of selection, parsimony and fidelity

S. Jasanoff, Virtual, Visible, and Actionable: Data Assemblages and the Sightlines of Justice, *Big Data & Society*, Vol. 4, No. 2 (2017). [PDF]

I. Chotiner, India's Uncounted COVID-19 Deaths, *New Yorker*, April 27, 2021. [PDF]

Wednesday, February 16: Counting the dead (Agathangelou)

Classification, sampling, model assumptions and noise

A. Agathangelou and K. Killian (2019) Paved with Good Intentions? The Road of the Humanitarian Project of DNA Identification of the Missing in Post-Conflict Cyprus. In: CharlÃ©s and Samarasinghe (eds.) *Family Systems and Global Humanitarian Mental Health*. Springer. [PDF]

B. Rappert (2012) States of ignorance: the unmaking and remaking of death tolls. *Economy and Society* **41**(1): 42â€“63. [PDF]

[OPTIONAL] A. Agathangelou (2017) Humanitarian Innovations and Material Returns: Valuation, Bio-financialisation and Radical Politics. *Science, Technology & Society* **22**(1):78-101. [PDF]

Monday, February 21: HOLIDAY (no class)

Module II: Models - *How do we tell stories with data?*

Wednesday, February 23: Introduction to Models (Evans)

C. Oâ€™Neil (2016) Bomb parts: what is a model? In: *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. The Crown Publishing Group. [PDF]

A. Saltelli, G. Bammer, I. Bruno et al. (2020) Five ways to ensure that models serve society: a manifesto. *Nature* 582(7813). 7813. Nature Publishing Group: 482â€“484. [PDF]

J. Furman, Why Did Almost Nobody See Inflation Coming? *Project Syndicate*, January 17, 2022. [PDF]

Exercise 2: Due Wednesday, February 23 at 5 PM (expert number)

- Find a number you find interesting and analyze the expert infrastructure that generated it.

Monday, February 28: GIGO and Models (West)

C.T. Bergstrom and J.D. West (2020) â€œNumbers and Nonsense.â€ In: *Calling Bullshit: The Art of Skepticism in a Data-Driven World*, pp. 167-223, New York: Random House. [PDF]

G. Oladipo, â€œMore than half of US police killings are mislabelled or not reported, study finds,â€ *Guardian*, October 1, 2021. [PDF]

D. Khullar, Have You Already Had a Breakthrough Covid Infection? *The New Yorker*, August 22, 2021. [PDF]

Wednesday, March 2: Autonomous vehicles (Stilgoe)

J. Stilgoe (2017) Machine learning, social learning and the governance of self-driving cars. *Social Studies of Science*, 48(1), pp. 25-56. [PDF]

R. Mitchell, Why do Tesla cars keep crashing into emergency response vehicles? Federal safety agency is investigating, August 16, 2021. [PDF]

[OPTIONAL] J. Stilgoe (2020) â€œWho Killed Elaine Herzberg,â€ In: *Whoâ€™s Driving Innovation?: New Technologies and the Collaborative State*, Palgrave Macmillan. [PDF]

Monday, March 7: Algorithmic bias (Evans)

R. Benjamin (2019) â€œIntroduction.â€ In: *Race After Technology*: *Abolitionist Tools for the New Jim Code*, pp. 14-22 & 44-56, Cambridge UK: Polity Press. [PDF]

K. Crawford (2021) â€œClassification.â€ In: *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*, pp. 123-149, New Haven: Yale University Press. [PDF]

R. Heilweil (2020) Why algorithms can be racist and sexist, *Vox*, February 18. [PDF]

[OPTIONAL] V. Eubanks (2018) â€œThe Allegheny Algorithm.â€ In: *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. New York: St. Martinâ€™s Press. [PDF]

Wednesday, March 9: 2 degrees Celsius? (Evans)

Carbon Brief Staff (2014) Two degrees: The history of climate changeâ€™s speed limit. [PDF]

C. Shaw (2009) The Dangerous Limits of Dangerous Limits: Climate Change and the Precautionary Principle. *The Sociological Review* **57**(2), pp. 103â€“123. [PDF]

Midterm Project Statement: Due Wednesday, March 9 at 5 PM

March, March 14 and 16: SPRING BREAK (no class)

Module III: Numbers in Public â€“ *How do numbers reflect society?*

Monday, March 21: Making Trustworthy Numbers (Jasanoff)

President Trumpâ€™s call with Georgia Secretary of State Brad Raffensperger

- Highlights [PDF]
- Seven-minute audio clip

[Optional] Full transcript and audio

A. Gerhart and J. Crump, Election results under attack: Here are the facts. *Washington Post*, January 14, 2021. [PDF]

S. Jasanoff, The Vanishing Square: Civic Learning in the Internet Age. Hastings Center Report, January-February 2021. [PDF]

Wednesday, March 23: Numbers and Social Choice - Trolley Problem (Greene)

[SKIM] J.D. Greene (2021) Trolleyology. [PDF]

J.D. Greene (2016) Our Driverless Dilemma. *Science* 352(6293):1514-1515. [PDF]

G. Calabresi and P. Bobbitt (1978) â€œIntroduction,â€ In: *Tragic Choices*, pp. 17-29, New York: Norton. [PDF]

S. Tavernise and A. Goodnough, A Grim Measure of Covidâ€™s Toll: Life Expectancy Drops Sharply in U.S., *New York Times*, February 18, 2021. [PDF]

Exercise 3: Due Wednesday, March 23, at 5 PM (public number)

- Find a public number and explain why you do/do not find it credible.

Monday, March 28: The Value of Life (Jasanoff)

P. Elie, What Do the Churchâ€™s Victims Deserve?, *New Yorker*, April 8, 2019. [PDF]

T-N. Coates, The Case for Reparations, *The Atlantic*, June 2014. [PDF]

K. Feinberg, â€œMoney Admonitions from 9/11, *New York Times*, March 25, 2015. [PDF]

Wednesday, March 30: Calculating Losses and Gains (Jasanoff)

D. Kysar (2012) Global Environmental Constitutionalism: Getting There from Here, *Transnational Environmental Law* **1**(1), pp. 83â€“94. [PDF]

The Ford Pinto Case:

- Case: The Ford Pinto | Business Ethics [PDF]
- The Ford Pinto | The American Museum of Tort Law [PDF]
- For an article of current relevance: Grand Canyon fatal helicopter crash 'probably caused by wind' [PDF]

Monday, April 4: Standardization (Jasanoff)

L. Busch, "Standardizing the World," in *Standards: Recipes for* Reality, pp. 77-80 & 142-149 (Cambridge: The MIT Press). [PDF]

J. Buolamwini, When the Robot Doesnâ€™t See Dark Skin. *New York Times*, June 21, 2018. [PDF]

P. Kingsnorth, â€œCitizens of Nowhere.â€ In: *Real England: The Battle Against the Bland*, pp. 1-21, London: Portobello. [PDF]

Module IV: Institutions â€“ *How do our data and models work in society?*

Wednesday, April 6: Numbers in Court I (Jasanoff)

S. Jasanoff (2002) Science and the Statistical Victim: Modernizing Knowledge in Breast Implant Litigation. *Social Studies of Science* **32**(1):37-69. [PDF]

Bloomberg, Monsanto Has to Pay $289 Million in Damages in First Roundup Cancer Trial. Fortune, August 11, 2018. [PDF]
Anonymous, Bayer Beware. *The Economist*, August 16, 2018. [PDF]
P. Cohen, Roundup Maker to Pay $10 Billion to Settle Cancer Suits. *New York Times*, June 24, 2020. [PDF]

Exercise 4: Due Wednesday, April 6 at 5 PM (controversial number)

- Find a number that has generated public controversy and explain why it remains contested.

Monday, April 11: Numbers in Court II (Harvard Admissions Exercise)

[SKIM] Students for Fair Admissions, Inc v. President & Fellows of Harvard Coll., 397 F. Supp 3d 126, (D. Mass. 2019).

K. Carapezza, As Supreme Court Weighs Harvard Admissions Case, Two Asian Americans Speak Out and Allege Bias. GBH, July 22, 2021. [PDF]

E. Hoover, Dueling Economists: Rival Analyses of Harvardâ€™s Admissions Process Emerge at Trial. *The Chronicle*, October 30, 2018. [PDF]

Wednesday, April 13: Tech Platforms (Evans)

F. N. van der Vlist (2016) Accounting for the social: Investigating commensuration and Big Data practices at Facebook, *Big Data & Society* **3**(1). [PDF]

S. Zuboff (2019) â€œRendition: From Experience to Data.â€ In: *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, pp. 233-255, New York: PublicAffairs Books. [PDF]

Monday, April 18: Finance and the Electronic Frontier (Ã–zgÃ¶de)

S. Jasanoff, â€œInformationâ€™s Wild Frontiers.â€ In: *Ethics of Invention*, pp. 147-176, New York: Norton. [PDF]

O. Ã–zgÃ¶de "The Invention of Economic Growth: The Forgotten Origins of Gross Domestic Product in

American Institutionalist Economics." ProMarket.org. October 31, 2021. [PDF]

E. Stewart (2021) The GameStop stock frenzy, explained, *Vox*, January 29. [PDF]

[OPTIONAL] Caitlin Zaloom, â€œAmbiguous Numbers: Trading Technologies and Interpretation in Financial Markets,â€ American Ethnologist 30, no. 2 (May 2003): 1-15. [PDF]

Wednesday, April 20: Wrap-Up (Jasanoff and Evans)

S. Jasanoff and H.R. Simmet (2017) No funeral bells: Public reason in a â€˜post-truthâ€™ age, *Social Studies of Science* 47(5), pp. 751-770 (NOTE: read only pages 761-66). [PDF]

Exercise 5: Due Wednesday, April 20 at 5 PM (emergent or future numbers)

- Find an issue or problem that is not enumerated but should be, and explain how one would go about quantify or mathematize it.

Monday, April 25: Student presentations

Wednesday, April 27: Student presentations

*****Final project due Thursday, May 5 at 5 PM*****