

DPR 201: Design and Data Analysis for Social Impact

Dr. Miles D. Williams

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Class Room: Higley 325

Course Description

Political data surround us everywhere we look. How do we use this data for maximum social impact? We start by thinking clearly with data and using a good research design. To do this well, you need to be armed with the appropriate tools and enough conceptual understanding of them to know how to use them.

In this class, we'll cover the basics of research design for social impact. By taking a problem-centric approach, we'll work through how to use data, data modeling, and statistics to describe patterns in the world and establish basic facts, make predictions, and conclude whether policy interventions really had any impact.

As long as you apply yourself, by the time you finish this course you will have made progress in your ability to do statistical programming, think clearly with data, and reason quantitatively, all with the goal of applying these skills to problems in the world of politics and policy.

Class Schedule

		MA Due	AC Due	Class Day		
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1				
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1				
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	April					
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	May					
		1	2	3		
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
Sun	Mon	Tue	Wed	Thu	Fri	Sat

Notable dates: MLK (01.20), Spring Break (03.17-03.21), MPSA (04.03-04.04), Final Day of Instruction (05.05)

Note: All due dates are by midnight, unless otherwise specified. Course readings for Wednesday discussions will be posted to Canvas.

Week 01, 01/19 - 01/23

- Monday: No Class (MLK)
 - Wednesday: Syllabus day

Part I: Description - Was there any rhyme or reason to U.S. aid cuts?

Week 02, 01/26 - 01/30

- Monday: R Basics and Looking at Data
 - Wednesday: “The Impact of Foreign Aid Cuts” and “U.S. Foreign Aid Freeze & Dissolution of USAID: Timeline of Events”

Practice set due and in-person assessment (IPA)

Week 03, 02/02 - 02/06

- Monday: [Modeling Data](#)
- Wednesday: [“Who Gives Foreign Aid to Whom and Why?”](#)

Practice set due and IPA

Week 04, 02/09 - 02/13

- Monday: [Quantifying the Role of Chance](#)
- Wednesday: [“Down the Rathole? Public Support for US Foreign Aid”](#)

Practice set due and IPA

Week 05, 02/16 - 02/20:

- Monday: Introduce MA1
- Wednesday: Work on MA1

Part II: Prediction - U.S. Presidential Elections

Week 06, 02/23 - 02/27

- Monday: [Make Predictions](#)
- Wednesday: [“The Political Economy Model: Presidential Forecast 2024”](#)

Practice set due and IPA

Week 07, 03/02 - 03/06

- Monday: [Model Validation and Selection](#)
- Wednesday: Listen to [“Colloquy Podcast: How Reliable Are Election Forecasts?”](#)

Practice set due and IPA

Week 08, 03/09 - 03/13

- Monday: Introduce MA2
- Wednesday: Work on MA2

Week 09, 03/16 - 03/20

Spring Break!

Week 10, 03/23 - 03/27

NO CLASS (ISA)

Part III: Causation - Scientific Evaluation of Policy

Week 11, 03/30 - 04/03

- Monday: [Causation and Randomized Trials](#)
- Wednesday: Listen to podcast about [In COVID’s Wake](#)

Practice set due and IPA

Week 12, 04/06 - 04/10

- Monday: [Selection on Observables](#)
- Wednesday: Read [“Ethnicity, Insurgency, and Civil War”](#)

Practice set due and IPA

Week 13, 04/13 - 04/17

- Monday: Regression Discontinuity
- Wednesday: Read “How reducing documentation burdens impacts equity in access to small business COVID-19 relief funding”

Practice set due and IPA

Week 14, 04/20 - 04/24

- Monday: Difference-in-Differences
- Wednesday: Read “Effects of the Minimum Wage on Employment Dynamics”

Practice set due and IPA

Week 15, 04/27 - 05/01

- Monday: Introduce MA3
- Wednesday: Work on MA3

Week 16, 05/04 - 05/08

- Monday: Course debrief + evals
- Wednesday: Finals Begin

MA3 Due Wed. May 6 by 8:30pm

Course Objectives

In this course, you'll develop a number of skills.

Quantitative You will develop your quantitative skills in the treatment of data. You'll learn how data are gathered, assembled into datasets, and most effectively analyzed to describe and draw inferences for maximum impact.

Communication It is not enough to have a well-designed analysis. To have any social impact with your research you need to be able to effectively communicate your research to others. In this course, you will have opportunities to relay your research and findings through written, verbal, and visual media.

Critical Thinking Critical thinking involves “confronting multiple, competing perspectives and adjudicating between them.” This is the essence of what is required to organize data, develop a research design, and draw conclusions.

Statistical Programming In addition to learning the intuition behind statistical methods like multiple regression, causal inference, and forecasting, you will gain experience applying these methods using the R programming language and RStudio IDE.

Analysis Software

Students will use R and RStudio, which are free and open source. You can access these on the cloud through the Posit Workbench available through a web browser installed on a Denison server at `r.denison.edu`. This can be accessed on campus on any computer or through a VPN off campus. To use the VPN:

1. Go to myDenison.
2. Head to MyApps.
3. Select Remote Access.
4. Follow the instructions to download and use the VPN.

Most necessary R packages for the course are already installed in the server version.

While using the **Denison server version is highly recommended**, you are also welcome to download and install local versions of R and RStudio on your laptop. Follow [this guide](#).

Required and Recommended Readings

In addition to reading some short pieces written by journalists, academics, and others available online, the primary course text will consist of online lecture notes that I have compiled into an open source online book, which you can access here:

[Data and Research Design for Social Impact](#)

When I've taught this course in the past, I have also primarily used the following textbook. I don't use it any more, but it's still a good resource, so you should check it out if you're interested and have the budget:

Bueno de Mequita, Ethan and Anthony Fowler. 2021. *Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis*. Princeton: Princeton University Press.

Resources

The Instructor (that's me!)

During my office hours, my door is always open! If you have any questions or concerns about the course, just drop by my office Monday or Wednesday between 10:30-11:30am or Friday 1:00-2:30pm. No appointment necessary. If those hours don't work for you, we can work out a different time to meet.

You can email me at williamsmd@denison.edu any time. I'll try to respond as quickly as possible, but if you email me after 5 pm, you may not get a response from me until the next workday.

Teaching Assistant

DPR hires teaching assistants each semester to provide you with extra help and tutoring. Contact information, hours, and locations for our TAs are included below. Our TAs are a great resource if you're having trouble with your code or are stuck on a problem.

TBD

- **email:** TBD
- **hours:** TBD
- **location:** TBD

Accessibility

Students with a documented disability should complete a Semester Request for Accommodations through the MyAccommodations app on MyDenison. It is the student's responsibility to contact me privately as soon as possible to discuss specific needs and make arrangements well in advance of an evaluation. I rely on the Academic Resource Center (ARC) located in 020 Higley Hall, to verify the need for reasonable accommodations based on the documentation on file in that office. Reasonable accommodations cannot be applied retroactively and therefore ideally should be enacted early in the semester as they are not automatically carried forward from a previous term and must be requested every semester.

Writing Center

Every writer—no matter the course or their experience level—needs a reader and benefits from deep conversation about their work! At the Writing Center, student consultants are eager to support you at any stage of the writing process including (but not limited to): deciphering assignment instructions, brainstorming, developing an argument, organizing your ideas, integrating research and sources, working with faculty feedback, and/or polishing a draft. Consultants, who are themselves experienced writers from a range of areas of study, are specially trained to support writing for any course or purpose from lab reports, research papers, and informal writing assignments to cover letters, personal statements, and other application materials. The Center welcomes writers from all backgrounds and levels of college preparation. Appointments can be scheduled for 25 or 50 minutes at <https://denison.mywconline.com/> and take place in-person in the Atrium level of the Library (A22).

Multilingual Support (L2)

Students who use English in addition to other languages are welcome to use the resources available at the Multilingual Learning Office (MLO). The MLO includes Morayo Akinkugbe, PhD, the Assistant Director of

Multilingual Programming and the student consultants who work with her. They are all trained and experienced in helping students address the different issues that arise when working in more than one language. If English is not your first or only language, please consider utilizing this resource, which is available to ALL Denison students. Dr. Akinkugbe and the student consultants offer a variety of support for L2 students, including consulting with you about your written language (grammar, syntax, word-choices), developing strategies to manage your reading assignments, assisting with class conversation and presentations, and helping to devise ways to develop and effectively use all your skills in English. You can set up an appointment via <https://denisonuappointments.as.me/mlo>, or by emailing the Multilingual Learning Office directly at englishhelp@denison.edu.

Reporting Sexual Assault

Essays, journals, and other coursework submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees are required by University policy to report allegations of discrimination based on sex, gender, gender identity, gender expression, sexual orientation, or pregnancy to the Title IX Coordinator. This includes reporting all incidents of sexual misconduct, sexual assault, and suspected abuse/neglect of a minor. Further, employees are to report these incidents that occur on campus and/or that involve students at Denison University whenever the employee becomes aware of a possible incident in the course of their employment, including via coursework or advising conversations. There are others on campus to whom you may speak in confidence, including clergy and medical staff and counselors at the Wellness Center. More information on Title IX and the University's Policy prohibiting sex discrimination, including sexual harassment, sexual misconduct, stalking and retaliation, including support resources, how to report, and prevention and education efforts, can be found at: <https://denison.edu/campus/title-ix>.

Course Policy

The course policy and requirements are detailed below. It all basically boils down to: (1) show up to class, (2) learn some stuff, and (3) don't cheat or trick me into believing you've accomplished 2.

Grading Policy

Grades at Denison are based on a standard 4.0 scale. You can read more about Denison's grading system [here](#). Generally, a 90 corresponds to an A–, an 80 to a B–, etc.

Grading Scale		
A+: 98%+	A: 92%	A-: 90%
B+: 88%	B: 82%	B-: 80%
C+: 78%	C: 72%	C-: 70%
D+: 68%	D: 62%	D-: 60%
F: below 60		

Attendance and Participation 10%

You should show up to class and participate! In terms of showing up, I'm generously offering 4 freebie absences (no questions asked). Life happens and my inbox is always full. So if you need a day because you're sick, you're traveling for sports or a performance, or you just want to go do something fun (I once cancelled class to go see Metallica) just take the time you need. However,

once those 4 freebies are used up, you should communicate with me to justify why you need to miss class or you will lose all attendance points upon your 5th absence. As for participation, I expect you to come ready to learn and engage in class discussion and group work. One way I'll keep you accountable is by randomly calling on you to answer questions. You don't have to get the answers right, but if it's clear you didn't know the answer due to lack of preparedness for class that will cost you a small amount of participation points (1% of your total class grade). On days when we're working on R code, I might ask you questions based on the lecture notes.

Practice Sets 15% Total

(Almost) every week I'll assign a practice problem set. The goal is to give you some extra practice with concepts or technical skills outside of the class relevant to course materials. These will be graded on a simple pass-fail basis and grades will be generous. Essentially, do your best and get it turned in and you'll pass. Don't turn it in or submit a clearly lack-luster attempt and you'll fail. I want you to have a low-stakes outlet for working on challenging material, and the work you submit will help flag for me any issues or areas where you seem to be struggling so I can intervene. I also want you to feel prepared for the next sort of assignment I talk about below.

In-person Assessments 30% Total

On a semi-weekly basis, we will round out our last day of class with an in-person assessment. The structure of these will vary, but they'll usually take the form of a pencil-and-paper assessment *with no devices or notes allowed*. The goal with these assessments is to give me as unobstructed a view as possible of your progress in the class. We're in a brave new world where, because of the proliferation of LLMs, it's increasingly difficult for instructors to differentiate student effort from Silicon Valley compute. An in-person pencil-and-paper assessment is the cleanest way I know how to cut through the noise.

Main Assignments 45% Total

You'll have three main assignments (MAs) to complete in this course. These will be mini-research papers that include data analysis relevant to the kind of research design we're discussing in a given unit. The prompts for these assignments will be made available when the time comes. These will involve wrangling some political data, analyzing it, and presenting your results through figures and a written summary. The first of these assignments will be done in groups, the second will be done individually, and the final MA of the course will be up to your discretion. For group assignments, grades will be given on a group rather than an individual basis.

10% (Attendance and Participation)
15% (Practice Sets)
30% (In-person Assessments)
+45% (Main Assignments)
100% (Total Assignments)

E-mail Policy

I will respond to your emails within 24 hours at the latest between Monday and Friday every week. Don't expect me to respond over the weekend or in the evenings—those times are family time, so I'll be less consistent about checking my inbox.

Make-Up Assignment Policy

There are **NO** make-ups for missed assignments. Don't bother asking. But, if you anticipate having trouble making a due-date and notify me ***in advance***, we can work out a solution. Otherwise, you have this syllabus which alerts you when assignments are due. Plan ahead!

Second Chances Policy

You have exactly one chance to complete your assignments, and only one chance should be necessary. There are days in class specifically carved out to work on your MAs, and my door is always open during office hours. You also have access to DPR TAs and the Writing Center. There are so many resources at your disposal as you complete your work in this class. Take advantage of them, and you won't need a second chance.

Attendance Policy

Attendance is part of your grade. As I noted in the "Grading Policy" section, you have 4 freebie absences—no questions asked or permission required. Beyond these 4 there are no more unexcused absences allowed. Missing class a fifth time will automatically trigger the loss of all your attendance and participation credit unless you communicate with me in advance to justify your absence.

Computer-based Excuses

Excuses for late or missed assignments based on CD, flash drive, or hard drive errors are **not acceptable**. The Denison network and server is reliable and accessible. If you use your Google Drive and the RStudio server, all your work will be backed up and easy to access from any computer on campus.

Late Assignments

Turn in your work on time. I want to give you timely feedback, which I can't do if you don't turn your work in. I try to start grading things within a week after due dates. If I don't see a submission from you, or if you haven't communicated with me about an extenuating circumstance requiring an extension, I'll give you a zero.

Electronic Submission

You will submit all of your assignments electronically via Canvas.

Academic Dishonesty Policy

Don't cheat. Just don't do it.

It should go without saying, but **plagiarism** is a form of cheating and it includes:

1. Copying or paraphrasing the ideas of others without citation or attribution.
2. Copying or paraphrasing the ideas of ***other students in the class*** (this includes using someone else's code and submitting it as your own).

I've had to deal with students plagiarizing before. It's painful for me and it puts a blight on the record of the student. It's not only cheating, it's stealing.

When in doubt about whether something constitutes cheating, consult Denison's [Code of Academic Integrity](#).¹ Be advised that this same Code of Academic Integrity requires that instructors notify the Associate Provost of cases of academic dishonesty. **Any incidence of academic dishonesty will result in failure of the course and referral to the Denison judicial process.**

¹Of course, if you have to ask yourself if something counts as cheating, then it probably is...

AI Policy

We will talk more in class about what I consider acceptable and unacceptable use of generative AI tools in this course. But I want to offer a brief sketch of my educational philosophy toward AI so you understand where I'm coming from. AI is here, and I know from student surveys that the vast majority of you are using it in some capacity. That means at least of few of you might find my attitude toward AI in coursework a bit draconian. But I assure you, my attitude is well-intentioned.

There are two common views on AI in the classroom that are making the rounds, and I strongly *disagree* with both.

The first is that AI-use is a skill, so you must start learning to use it well now in order to be effective and competitive in your future career. This view *sounds* right, which is why so many accept it without sparing a moment or two to think more carefully about it.

The second view I disagree with is that AI-use can be a useful scaffold for learning skills (like doing research, producing data visualizations, and writing up the results). This also sounds right, so few seem to question it.

I disagree with these views for two reasons. First, I think that using AI tools well is not really a skill; it's a second order implication of having skills. The people I see using AI effectively in their work today are people who developed expertise and skills before AI tools were readily available. Today, when they offload tasks to AI agents, they generally aren't asking the AI to do what they can't already do. They're asking it to take some work off their plate so they can focus on other tasks. Importantly, they know how to double-check and refine what their AI agents produce because they already know how to do the tasks they outsourced—or they're experienced enough that they could figure it out on their own given enough time.

Think about it, if you aren't a competent programmer, how can you know for sure if the code you ask an LLM to produce for you works as intended? How will you be able to troubleshoot a bug in LLM written code when you receive a vague and unhelpful error message? When it comes to writing a report or a paper, how will you actually know if LLM-generated text is factually correct or well-written? You need to have a solid foundation of knowledge and skills first before you can be a critical and competent user of these tools. Maybe this will change in the future, but I have yet to see strong evidence that that future is here already.

Not only does the ability to critically use AI tools come from having abilities in the first place, [research](#) shows that access to AI tools while you're still learning important skills stunts your development rather than enhances it. This is especially important for working with programming languages and writing papers. A programming language *is a language*, and the only way to learn to speak it fluently is to actually spend some time speaking it. If you don't put in the work yourself, if you offload the cognitive burden to an LLM, you will never learn the language. In the same way, if you never write stuff on your own (as messy and awkward as your writing sometimes seems), you will never actually develop the ability to write well, much less learn the specialized skill of writing with data, or for that matter learn how to compose a convincing and logically sound argument. You certainly won't be able to verbally communicate to others about your research in any way that sounds remotely competent.

Think of it this way. Say you started going to the gym to lift weights, but you used a robot to do all the heavy lifting for you. Do you think you'd actually get stronger? Of course not. You'd never develop any new muscle, and none of your personal records would actually be yours; they'd be the machine's. Coding and writing are exercises that work your brain—probably one of the most important muscles in your entire body. You should exercise your brain. You should do your own work.

By the way, research backs me up on the point that outsourcing work to LLMs leads to weak brains. [That same study](#) I mentioned before shows that failing to write stuff on your own, that using an LLM instead, adversely affects the architecture of your brain. People who had access to LLMs showed weaker neural connectivity in several parts of their brains than those denied access to LLMs. If you want a strong mind, the less you rely on

LLMs, especially early on, the better. And once you develop a solid foundation, you should probably maintain a steady “exercise” regimen of LLM-free work to maintain your edge.

Consider another example. With some important exceptions, many people today don’t have to engage in manual labor to “earn” their calories. Not long ago by historical standards, 90% of Americans worked in agriculture. Today that figure is less than 1%. As a result, chronic and non-communicable diseases (things that stem from too much inactivity and poor lifestyle choices) are the leading cause of death. One way that I personally try to counteract the fact that I work a non-labor-intensive job is to lift weights and do high intensity interval training every week. Essentially, I simulate manual labor, and this helps me to maintain my health.

I think LLMs are going to do to knowledge-based work what the industrial revolution did to manual labor. Without a commitment to simulating difficult cognitive tasks on a regular basis, I think cognitive decline is going to become a real issue in the coming years and decades, in the same way that physical health has declined as the need to engage in manual labor has disappeared (at least in industrialized countries). Now is the time to develop the habit of exercising your mind. It’s going to become much harder to develop this habit down the road.

Okay, but what if you want use an LLM to just help you study? To that I say, *sure*. I’ve seen plenty of examples of people using LLMs to learn new things, and to great effect. But be careful. LLMs weren’t designed by educators for educational purposes. That means their use is riddled with landmines, ready to do real damage to your learning. So you need some strategies before you use LLMs as a study aid. [This article](#) should give you a good place to start. It offers practical tips to cajole an LLM into behaving in ways more conducive to learning. A word of warning though: don’t go down this path unless you know you have self-control. Because, and I repeat, LLMs are not educational tools, you have to use them intentionally and strategically. That’s hard to do.

In sum, you need skills to use AI tools effectively, and you give yourself the best chance of developing relevant skills the less you rely on AI. This class is an opportunity for you to learn, not to avoid learning. (I’ll also add you are paying thousands of dollars just to take this single class, so don’t waste your money or my time.)

I feel particularly compelled to make sure you do actually learn something in this class because a downstream implication of too much LLM use too soon is going to be the systematic *de-skilling* of the future workforce (which includes *you*). That’s my prediction anyway, and plenty of others share my concern. The sad result will be that more and more students make themselves replaceable in their future careers. Think about it, if your “skill” is that you know how to prompt an AI to perform a task, why does your employer need *you*? Anybody can figure out how to prompt AIs to do *something*, and some of the latest versions will do quite a lot on the basis of a very short or even vague request. If you want to be competitive, you need to demonstrate what *you* can do; not what you can ask an AI agent to do. And, going back to my previous points, if you rely on AI tools too much too soon in your education, you’ll have only the brittlest of skills to offer a future employer (or graduate admissions committee). And those brittle skills will actually make you a poor user of AI.

So use this class as an opportunity to become a more competent AI user by avoiding the temptation to use AI.