

Data-Based Teaching: An Introduction and Call for Collaboration

Eric Loepp, *University of Wisconsin–Whitewater*

ABSTRACT

Political science instructors increasingly use interactive pedagogies that emphasize active learning over traditional lecture formats. I contribute to this effort by developing a data-based teaching method that relies on student-generated data to illustrate course concepts and to serve as a foundation for a variety of activities in political science classrooms. This article summarizes the technique based on my experience in an introductory course in American government. However, given that this method is not intrinsically limited to any topic or area, I also provide examples of how the basic framework may be applied to other subfields in political science. I conclude by calling for the creation of a network of teacher–scholars interested in developing, sharing, and refining best practices related to data-based teaching.

At the beginning of every term, I poll students enrolled in my introduction to politics and government course about why they are there. Do they plan to major in political science and/or pursue a career in politics? Does the course fulfill a requirement for another major? Are they simply curious about politics? In my experience—and perhaps in yours—many students enter introductory courses with no intention (at least initially!) of pursuing political science as a course of study. This can pose a challenge to instructors who want to effectively interact with an assembly of students whose extant levels of knowledge and interest vary widely. How can we meaningfully connect and engage with such diverse groups? A helpful approach, it turns out, is to not strictly focus on exposing students to politics and government as external entities. Rather, students display more curiosity and enthusiasm when they explore their own politics and those of their peers.

I recently developed a pedagogical approach that introduces politics and governing using data collected from students as a primary resource. Formally, I define this data-driven classroom as a family of pedagogical strategies in which original data from students are analyzed to illustrate and explore course content (Loepp 2018). This is how it works: an extensive set of student-generated data are collected at the beginning of the term via a mandatory course survey; results are then integrated into lectures and activities throughout the term.¹ Although the use of data-supported instruction is not a new phenomenon (see, e.g., Baumann, Marchetti, and Soltoff 2015; Bojinova and Oigara

2011), I attempt through this pedagogy to move beyond in-class opinion polling and use data in various creative ways. For example, one day I may present the results of an experiment illustrating a causal relationship; another day, I may present a word cloud and ask students to diagnose why certain terms and ideas are more prominent than others. In some cases, I collect data at multiple points in the semester and students evaluate them longitudinally. For instance, they may be tasked with explaining why certain patterns—such as the distribution of partisans in the room—vary minimally, whereas other items—such as presidential approval ratings—fluctuate more over time. With access to demographic and political data from students, I also can present useful contrasts and comparisons.² How do Republicans and Democrats differ in terms of ideology? How do men and women differ in their views on affirmative action?

The pedagogical benefit of this approach lies in the subject pool used to generate these data. When students study themselves—a process known as “autoethnographic inquiry” (Chang 2007)—they tend to enjoy it and often engage with course material more than they might otherwise (Camigan 2010; Cook 2014). Integrating data into the political science classroom facilitates a connection between students and politics in ways that traditional resources such as textbooks or even intriguing current events cannot. Indeed, as the scholarship of teaching and learning increasingly affirms the value of active learning (Asal 2005; Florez-Morris 2010; Glazier 2011; Walker et al. 2008) and the benefits of data visualization (Henshaw 2018; Rom 2015) in the classroom, a data-based approach to teaching provides instructors with myriad opportunities to engage with students in personal and meaningful ways. Student-generated data provide a complementary approach that can both invigorate

Eric Loepp  is assistant professor of political science at the University of Wisconsin–Whitewater. He can be reached at loepp@uww.edu.

class lectures and serve as a foundation for other active-learning exercises.

DATA IN THE AMERICAN POLITICS CLASSROOM

To illustrate the value of data-driven teaching, consider a few examples. One of the first activities I do with students every term uses their responses to the following question:

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Imagine you came across some money, say, \$100 or so. It is unclear who it belongs to or where it came from, so it is yours to do with as you please. It is not essential for your living expenses, just some extra cash. Which of the following things would you choose to spend the money on?

Students then select from the following six (randomized) options:

- Give it to the government to fund public programs or services.
- Donate it to a church or charity organization.
- Save it in a bank or invest it.
- Buy yourself something nice.
- Buy a friend or family member something nice.
- Turn it in to the police.

Figure 1 presents results of this inquiry from a recent semester (note: one answer category was ignored by students altogether and therefore does not appear in the figure).³ Unsurprisingly, most individuals tend to use their windfall to fund personal endeavors. Yet, the data reveal an equally important pattern: by and large, students choose *not* to contribute surplus resources toward *public* ends. Only a few individuals are inclined to donate the money to fund public programs or services, although several more would

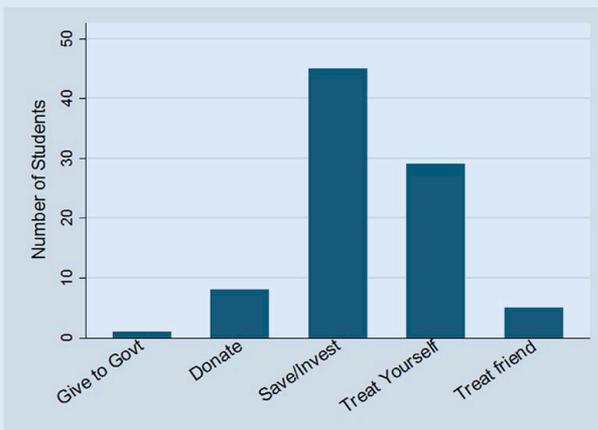
donate it to non-governmental charitable organizations. These data provide a novel basis for two related discussions. First, what do these attitudes reveal about human nature as it concerns the promotion of individual versus public goals? Second, given those attitudes, how do we craft a government that promotes the general welfare? Many instructors explore these types of questions in the context of, for example, James Madison's disquisition on

human nature and factions in *Federalist 10*. Infusing data provides a simple but powerful supplement to conversations concerning the normative imperatives of government. Indeed, students who may show minimal interest in a textbook or treatise often report data-based teaching to be a vitalizing alternative approach to exploring these fundamental questions.

In addition to pure opinion or attitudinal data, I find that embedding simple experiments in the class survey can yield significant dividends in the classroom. In some cases, I attempt to replicate classic political science studies that illustrate important phenomena covered in many introductory courses. For instance, I routinely administer a variant of Nelson, Clawson, and Oxley's (1997) seminal study on media frames. Students review a fictional news story reporting that the Ku Klux Klan is interested in hosting a rally in the area. The story, however, is framed in different ways. In one condition, a local politician is quoted as saying, "I may not agree with the KKK's views, but they have as much a right to speak as anyone. As long as they do not break the law, they should be allowed to speak and people who want to hear their message should have a chance to do so." In the other condition, the politician says, "I'm all for freedom of speech, but public safety should be the priority here. The rhetoric of the KKK is liable to incite violence between Klan members and citizens who wish to protest against the rally." Students then are asked to imagine that they were another local politician.⁴ What would their position be? Should the KKK be allowed to hold the rally or not? Figure 2 presents results from a recent cohort of students. Consistent with the original study's findings, student attitudes are partially informed by the frame to which they are subjected. Critically, however, the pedagogical value is derived not merely from a methodology that convincingly demonstrates causality; rather, it is the fact that the phenomenon in question is at work in the room.

As helpful as replications can be, in many cases, new and original data are more appropriate. Developing these instruments can be challenging but also fun and rewarding. How can we spice up course material that some students find unappealing or uninteresting? Some topics, such as partisanship and civil liberties, naturally lend themselves well to the data-based approach; others, such as bureaucracy and federalism, do not. Yet, developing data-based strategies for exploring these latter topics can reinforce important points that students otherwise may miss. Indeed, in some ways, content about which students are less enthusiastic benefits from data more than subject matter that they find more

Figure 1
What Would You Do If You Found \$100?



interesting. For example, when addressing federalism in my introductory courses, I often use two data elements. First, I generate a histogram summarizing student attitudes concerning where they believe government power should be concentrated.⁵ That is, to what extent should power be focused at the state level versus the federal level? Figure 3 summarizes responses to this question when put to a recent group of students. These data set up a class

In both cases, students are asked to indicate whether they believe the federal government should step in and countermand the state action.

Figure 4 summarizes results of the experiment. Perhaps unsurprisingly, support for states' rights rings considerably louder when the issue at hand is marijuana legalization. Students generally are amused by the disparity and a few jokes often are

Yet, these data hold the key to initiating an important discussion about the vertical diffusion of power. If attitudes about national supremacy versus reserved state powers vary based on the issue at hand, how do we establish a fair and functional governing hierarchy?

discussion about the advantages and drawbacks inherent in placing certain powers under the purview of certain governments.

The second data-based teaching strategy during our federalism unit centers on the following experiment. Students are told that sometimes individual states pass laws or policies that conflict with the wishes and/or laws established by the federal government. They then are asked to consider an example. Some students are randomly assigned to think about Colorado's recent marijuana-legalization efforts, as follows:

As you may know, Colorado has recently made marijuana legal to sell and to use, despite federal laws that say marijuana is still illegal. In your opinion, should the national government enforce federal law and make Colorado stop?

Other students are randomly selected to reflect on Arizona's efforts to strengthen local law enforcement's authority to combat illegal immigration, as follows:

As you may know, Arizona has recently passed laws giving state officials more power to enforce immigration laws, despite federal laws that say immigration is a federal issue and states should not get involved. In your opinion, should the national government enforce federal law and make Arizona stop?

exchanged. Yet, these data hold the key to initiating an important discussion about the vertical diffusion of power. If attitudes about national supremacy versus reserved state powers vary based on the issue at hand, how do we establish a fair and functional governing hierarchy? These "big-picture" questions about democracy are at the heart of many introductory political science courses. In addition to building a technical knowledge base and developing important professional skills (e.g., writing effectively), many instructors seek to cultivate in students a capacity to reflect and comment on the state of democracy around us. How *should* our political system be set up? To what extent do the ideals of our founding period pervade civic life today? What is America doing correctly, and what, if anything, can be improved?

We cannot underestimate the benefits of data-based teaching in pursuing these goals. When evaluating this pedagogy, many students report that data make the course more personal, relevant, and interesting. One student stated: "I wouldn't have given some areas too much thought, but once the data was integrated into the class, I was intrigued to see how my peers felt about... topics asked about on the survey."⁶ Another reported that "[t]he student survey has been very helpful [...] because it helps me personally connect with the material that is presented in class and in the textbook. It also makes class very interesting because I get to see my [classmates'] perspective[s] and political

Figure 2
Should the KKK Be Allowed to Hold a Rally in Town?

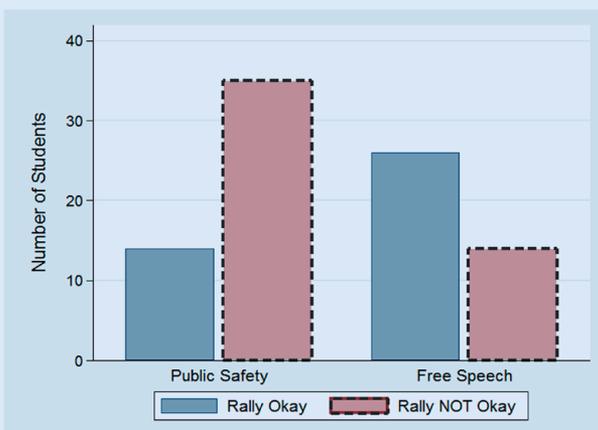
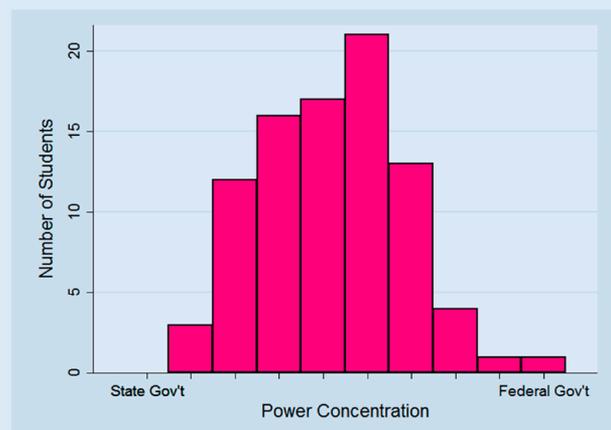


Figure 3
Where Should Government Power Lie?



stance[s] and knowledge, as well.” Other students commented on additional benefits, such as the opportunity to engage in visual learning as well as to offer political opinions without necessarily speaking up every class period. In short, the data-driven classroom has been incredibly well received by students. Both qualitative

As with other applications, students give considerable weight to these tools because they were a part of the data-generating experience.

Recently, my colleagues and I have considered data applications across other subfields in our discipline. In what ways, for

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comments and quantitative evaluations affirm that this pedagogical approach can promote engagement, interest, and content retention.

BEYOND THE AMERICAN CLASSROOM

Although originally conceived and developed with American politics courses in mind, the data-driven-classroom concept is not limited to any discipline or subfield. In the past year, for instance, I incorporated numerous survey items that generated useful data for my upper-division course in political science research methods. For example, student-generated data can demonstrate clearly and convincingly how different measurement specifications of concepts such as sexism (Glick and Fiske 1997; 2011), homophobia (Monto and Supinski 2014), and Islamophobia (Bleich 2011) can yield substantively distinct results in the data. In addition, I use experiments to illustrate phenomena such as question-order effects (Moore 2002; Rasinski 1989), wording effects (Greenhill et al. 2014), and the consequences of open versus closed questions (Schuman and Scott 1987). A particularly useful application is a demonstration of how public support for creating a path to citizenship for individuals who are in the United States illegally can be manipulated by posing the question in different ways.⁷ Later in the term, when students are tasked with developing their own original research projects, they have available a set of data and exercises that can help them avoid the pitfalls of poor research design.

instance, can data promote learning in international relations courses? A few questions we generated include the following:

- What is the most serious threat to the security of the United States: climate change, nuclear proliferation, or terrorism?
- To what degree do you consider China a threat to US security?
- How important is it that the United States is the most powerful country in the world?
- Under what conditions is nationalism/patriotism a danger to international peace?
- Does the United States have a moral responsibility to assist other countries in offering assistance to war refugees?
- Should all countries in international alliances contribute the same resources to the collective defense, or do larger and wealthier countries have an obligation to pitch in more than smaller countries?
- How important are institutions such as the United Nations to maintaining peace and security in the world?
- Why should the United States invest in combating poverty in other countries when poverty already exists here?
- Would the world be safer if the United States and Russia worked together to reduce their stockpiles of nuclear weapons?

Here, too, we observe various types of questions. Some inquiries concern fundamental values and preferences, allowing the instructor to visually map initial attitudes in the classroom at the beginning of the term. Others ask students to rank various problems and challenges—a particularly useful exercise when preparing to have discussions or simulations regarding American priorities abroad. As before, more intricate data applications also can be integrated into the international relations context. For example, imagine that students are asked to read about a country that has suffered from a severe drought (or genocide or natural disaster) and to indicate the degree to which they believe the United States should intervene. An experiment manipulating the geographic location of that country (e.g., western versus eastern hemisphere or Africa versus Europe) may yield important insights about how individuals form impressions concerning global challenges. Scholars and teachers of international relations have identified various effective simulations and activities to convey the substance of this material to undergraduate students (Asal and Kratoville 2013; Bridge and Radford 2014; Giovanello, Kirk, and Kromer 2013; Sasley 2010). Student-generated data provide additional

Figure 4
Should Feds Step in and Stop State Action?



opportunities to promote engagement and interaction in our political science classrooms.

CONCLUSION: BUILDING A DATA-BASED TEACHING COMMUNITY

The benefits of data-based teaching are not limited to any type of classroom or university. Political science courses across the country explore similar questions and themes aimed at developing student knowledge and critical-thinking skills as they relate to the world of politics. My experience illustrates the efficacy of data-based teaching in this endeavor, and I invite peers exploring similar questions and phenomena to try it out for themselves. I am happy to provide the survey I use in my introductory courses as a turnkey activity that other instructors can use if they are interested in exploring the potential for data-based teaching in their own courses. The survey is available to colleagues in two forms: (1) I can distribute a list of questions in a Word document; and (2) online access to the survey can be shared with Qualtrics account holders. Interested colleagues can make a copy of the master survey and then adjust their own version to meet individual course needs. In addition, corresponding Stata code to generate figures for many of the survey items can be made available—a step that I hope will make it easier for others to use data in their teaching. Even if instructors are unsure about how data may factor precisely into their plans, these digital documents can facilitate simple tests to see how they may be integrated into other classrooms. I invite all interested individuals to contact me if they would like to review these survey documents.

In addition to sharing ideas for survey design, there may be value in sharing the resulting datasets with one another. Scholars at different types of universities or in different regions serve various student populations; thus, patterns that emerge at my university may or may not align with results uncovered by colleagues at other institutions. Both outcomes present pedagogical opportunities. If certain data trends are common regardless of university or student body, the data underscore the robustness of the phenomena in question. By contrast, if students in, say, Wisconsin, generate meaningfully different results than students in, say, Oregon, then we can explore what factors may influence the disparate findings. More generally, pooling data from universities supports a multitude of in-class applications. For instance, a colleague and I are developing a shared dataset to provide our respective research-methods students with a hands-on illustration of the consequences of sampling methods. That is, how are results of an experiment affected when it is conducted with students at University A versus students at University B?

Regardless of how and to what degree individual instructors choose to incorporate data into their classroom, I am optimistic that we may soon develop a network of teachers and scholars who generate, share, borrow, evaluate, improve, and expand an organized collection of data-based teaching exercises. No individual textbook can comprehensively cover every aspect of a particular course; neither can individual instructors singlehandedly identify every beneficial application of data in the classroom, particularly outside of their subfield or discipline. It is my hope that some of the data exercises I use in my American politics and research-methods courses may prove helpful to others moving forward. I also am eager to hear how other instructors leverage this concept in their own courses. With some effort, we can

coordinate our data-based-teaching activities to the advantage of the entire political science community. ■

NOTES

1. Students are required to complete the survey as a participation grade; however, surveys are not graded for content.
2. All data are scrubbed of any identifying information before analysis.
3. Examples of data in the classroom have been approved for reproduction and research use (IRB Protocol Number L16709018Q).
4. The specific wording of the dependent variable is as follows: "If you were a political leader in [town] and the KKK wanted to hold a rally here, what would be your view?" Respondents then select one of two positions: (1) the KKK should be allowed to hold the rally; or (2) the KKK should not be allowed to hold the rally.
5. The specific wording of the variable is as follows: "As you may know, in our system of government, the state governments have certain powers and the national government has certain powers. There is considerable debate over how much power each level of government should have, as some people argue states should make decisions for themselves while others argue that a national government is better at making policy decisions. In a general sense, where do you think governmental power should lie, toward the states or toward the national government? Use the slider below to mark what you think makes sense." Students then drag an icon along a horizontal 11-point scale ranging from complete concentration of power in state governments on the left ("o") to complete concentration of power in the federal government on the right ("1o").
6. Student quotes have been approved for reproduction and research use (IRB Protocol Number L15604121Q).
7. An excellent discussion of this phenomenon is discussed in a July 2014 *Washington Post* article titled, "Immigration Reform Is Super Popular. Here's Why Congress Isn't Listening." Accessed October 3, 2018. Available at www.washingtonpost.com/news/the-fix/wp/2014/07/02/immigration-reform-is-super-popular-heres-why-congress-isnt-listening/?noredirect=on&utm_term=.3f7dd39202cb.

REFERENCES

- Asal, Victor. 2005. "Playing Games with International Relations." *International Studies Perspectives* 6 (3): 359–73.
- Asal, Victor, and Jayson Kratoville. 2013. "Constructing International Relations Simulations: Examining the Pedagogy of IR Simulations through a Constructivist Learning Theory Lens." *Journal of Political Science Education* 9 (2): 132–43.
- Baumann, Zachary, Kathleen Marchetti, and Benjamin Soltoff. 2015. "What's the Payoff? Assessing the Efficacy of Student Response Systems." *Journal of Political Science Education* 11 (3): 249–63.
- Bleich, Erik. 2011. "What Is Islamophobia and How Much Is There? Theorizing and Measuring an Emerging Comparative Concept." *American Behavioral Scientist* 55 (12): 1581–600.
- Bojinova, Emma, and James Oigara. 2011. "Teaching and Learning with Clickers: Are Clickers Good for Students?" *Interdisciplinary Journal of E-Learning and Learning Objects* 7 (1): 169–84.
- Bridge, Dave, and Simon Radford. 2014. "Teaching Diplomacy by Other Means: Using an Outside-of-Class Simulation to Teach International Relations Theory." *International Studies Perspectives* 15 (4): 423–37.
- Camigan, Patrick. 2010. "Starting with Self: Teaching Autoethnography to Foster Critically Caring Literacies." *Research in the Teaching of English* 45 (2): 179–204.
- Chang, Heewon. 2007. "Autoethnography: Raising Cultural Consciousness of Self and Others." In *Volume 12, Methodological Developments in Ethnography (Studies in Educational Ethnography)*, ed. Geoffrey Walford, 207–221. Bingley, England: Emerald Group Publishing Limited, 207–21.
- Cook, Peta. 2014. "To Actually Be Sociological: Autoethnography as an Assessment and Learning Tool." *Journal of Sociology* 50 (3): 269–82.
- Florez-Morris, Mauricio. 2010. "Using Video Production in Political Science Courses as an Instructional Strategy for Engaging Students in Active Learning." *Journal of Political Science Education* 6 (3): 315–19.
- Giovanello, Sean, Jason Kirk, and Mileah Kromer. 2013. "Student Perceptions of a Role-Playing Simulation in an Introductory International Relations Course." *Journal of Political Science Education* 9 (2): 197–208.
- Glazier, Rebecca. 2011. "Running Simulations without Ruining Your Life: Simple Ways to Incorporate Active Learning into Your Teaching." *Journal of Political Science Education* 7 (4): 375–93.
- Glick, Peter, and Susan Fiske. 1997. "Hostile and Benevolent Sexism: Measuring Ambivalent Sexist Attitudes toward Women." *Psychology of Women Quarterly* 21 (1): 119–35.

- Glick, Peter, and Susan Fiske. 2011. "Ambivalent Sexism Revisited." *Psychology of Women Quarterly* 35 (3): 530–35.
- Greenhill, Murni, Zoe Leviston, Rosemary Leonard, and Iain Walker. 2014. "Assessing Climate-Change Beliefs: Response Effects of Question Wording and Response Alternatives." *Public Understanding of Science* 23 (8): 947–65.
- Henshaw, Alexis. 2018. "Data Analysis and Data Visualization as Active Learning in Political Science." *Journal of Political Science Education* 14 (4): 423–39.
- Loepp, Eric. 2018. "Beyond Polls: Using Science and Student Data to Stimulate Learning." *Journal of Political Science Education* 14 (1): 17–41.
- Monto, Martin, and Jessica Supinski. 2014. "Discomfort with Homosexuality: A New Measure Captures Differences in Attitudes toward Gay Men and Lesbians." *Journal of Homosexuality* 61 (6): 899–916.
- Moore, David. 2002. "Measuring New Types of Question-Order Effects: Additive and Subtractive." *Public Opinion Quarterly* 66 (1): 80–91.
- Nelson, Thomas, Rosalee Clawson, and Zoe Oxlwy. 1997. "Media Framing of a Civil Liberties Conflict and Its Effect on Tolerance." *American Political Science Review* 91 (3): 567–83.
- Rasinski, Kenneth. 1989. "The Effect of Question Wording on Public Support for Government Spending." *Public Opinion Quarterly* 53 (3): 388–94.
- Rom, Mark Carl. 2015. "Numbers, Pictures, and Politics: Teaching Research Methods through Data Visualizations." *Journal of Political Science Education* 11 (1): 11–22.
- Sasley, Brent. 2010. "Teaching Students How to Fail: Simulations as Tools of Explanation." *International Studies Perspectives* 11 (1): 61–74.
- Schuman, Howard, and Jacqueline Scott. 1987. "Problems in the Use of Survey Questions to Measure Public Opinion." *Science* 236 (4804): 957–59.
- Walker, J. D., Sehoya Cotner, Paul Baepler, and Mark Decker. 2008. "A Delicate Balance: Integrating Active Learning into a Large Lecture Course." *CBE Life Sciences Education* 7 (4): 361–67.