Teaching Redistricting: Letting the People Draw the Lines for the People's House

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ABSTRACT The 2012 congressional redistricting was the first for which census data and mapmaking software were available to and easily useable by undergraduate students. We discuss our experience teaching the redistricting process to undergraduates and having our students draw constitutionally and statutorily valid congressional districts for Massachusetts. Bringing students into the process is a valuable teaching tool, and it also provides unbiased redistricting scenarios to state legislators and makes the redistricting process more open and transparent. Perhaps contrary to the fears of some legislators, our students placed substantial value on incumbency and the preservation of existing district lines, along with a respect for the traditional redistricting concerns of communities of interest and compactness.

In many states, the decennial redistricting process historically has been an example of partisan politics at its most brutal. As such, it has raised problems for democratic responsiveness—few citizens understand the process, and legislators in possession of data on past voting trends, in effect, can choose their constituents. The development of inexpensive, user-friendly mapping software, therefore, has been a boon to those who advocate a greater public role in redistricting.

Drawing maps is not particularly difficult, but drawing maps that stand up to legal challenges and that conform to the informal guidelines of the redistricting process is challenging. This article recounts our training of undergraduate students in the redistricting process and the consequences of this training for students' ability to develop congressional district maps that would represent serious contributions to state legislators' discussions and the broader public debate about how to draw congressional districts. Our experiment in teaching redistricting was in many ways a success—all our students were able to draw and discuss maps that met these criteria. Our experience also presented us with some surprising results: most notably, contrary to our expectations, students indicated a strong preference against independent, nonpartisan redistricting commissions and a preference for retaining the state legislature as the primary authority in drawing congressional district lines. Our experience in teaching students how to draw congressional districts is a resource for others who want to teach the subject or incorporate discussion of the redistricting process into American politics courses.

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BACKGROUND

This article reports on our experience teaching a small (14 student) seminar on the redistricting process at Clark University in the spring of 2011. Clark University is a private, selective university located in Worcester, Massachusetts. As of the fall of 2010, 2,203 of 3,167 students at Clark were undergraduates, primarily drawn from the East Coast and New England. Thirty-five percent of the most recent first-year class was from Massachusetts. Most consequentially for this article, Clark is a relatively liberal university; in 2008, Barack Obama received 86% of the vote in the precinct where most students reside.[1]

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To our knowledge, ours was one of the few courses devoted to the redistricting process.[2] The class was taught at the time that 2010 census data were made available, for students to draw districts while Massachusetts legislators were also doing so. We taught the course using the Districting for ArcGIS redistricting extension, a free, downloadable program for the ArcGIS software package that is widely available on college campuses.[3] In other words, we used resources that are available at a low cost to the general public and involve little training. Just before the 2010 census data became available students were trained in ArcGIS using the state's 2000 census data. Thus, they were prepared to start work at the same time as the state's legislators.

Massachusetts, by many measures, is among the most Democratic states in the United States. In 2010, the state reelected its Democratic governor, Deval Patrick, and all 10 of its Democratic members of the House of Representatives. As of 2011, the state's House of Representatives contained 128 Democrats and 32 Republicans, and the State Senate had 36 Democrats and four Republicans. These district lines arguably reflect some gerrymandering; state Republicans point to former senator Scott Brown's win in a January 2010, special election and to the string of four consecutive Republican governors before 2006 as evidence that the state is not as Democratic as the composition of its House delegation and state legislature would lead one to believe.

Massachusetts is also losing population relative to the rest of the United States. During the course, we knew that the state would be losing one House member when its new districts were drawn, and no House member as of yet had chosen to retire or run for higher office. The redistricting math, then, was simple. At a minimum, the districts would need to change such that at least two current House members were placed in the same district. Because some of the state's districts have been said to be oddly shaped, a redistricting plan that prioritized compactness might place more than two legislators in competition with each other. There are formal constraints on the process—the state contains one majority minority district (51.4% minority as of the 2000 census[4]), and in places (notably the Cape Cod area) the state's geography and borders limit the creativity of line-drawers. As in most other states, other informal constraints, including addressing the needs of different regions and avoiding dividing cities, exist. Massachusetts also exhibited larger population deviations than most other states; in 2000, the maximum deviation for congressional districts was 0.39%, the second largest of any state (Brunell 2008, 56).

Massachusetts state law specifies that a Joint Special Committee on Redistricting is to be created following the decennial census, and this special committee then presents its plan to the state House and Senate for approval.[5] Because the Democratic Party has had a sufficient majority in both chambers to override a gubernatorial veto, the bill produced by this joint committee has become law in the past three redistrictings without the governor's input. This lack of input has led to political intrigue; most notably, in the 2002 redistricting State House of Representatives Speaker Thomas Finneran initially pushed the joint committee to carve up the district of one House member he disliked, despite the fact that Massachusetts was not losing a seat in that year's redistricting.[6] The bad aftertaste left by the 2002 redistricting may have prompted the legislature to open up the process in 2011; the Joint Committee scheduled 14 public hearings throughout the state, including one held at Clark University in April 2011.

WHAT DO STUDENTS NEED TO KNOW ABOUT REDISTRICTING?

To draw meaningful congressional districts students need four types of background knowledge.[7] First, they need to be familiar with the legal issues surrounding redistricting and to understand how the Supreme Court's redistricting decisions have affected the drawing of congressional districts. Second, students should be acquainted with theories of political representation, such as Hannah Pitkin's (1967) *The Concept of Representation* or more recent works by Dennis Thompson (2002) and Andrew Rehfeld (2001). Third, they need some background in congressional organization and procedure. In many ways this is the most difficult subject to address in the course because it is a subject that is not directly related to redistricting. Using standard works by Richard Fenno (1978) and David Mayhew (1974), we explored the value of the committee assignments of Massachusetts House members, and the relationships between individual members and federal spending and the state's geographic features. Fourth, students must absorb information regarding the economy, politics, and history of different regions of the state, including patterns in socioeconomic status, sources of livelihood, and, for towns between larger cities, the extent to which a town is oriented toward one city or another. Students must get a sense not only of how populations across the state differ but of how different areas of the state think about themselves.

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Learning to use the mapping software is not difficult; nor is it difficult to draw districts if one's only concern is to produce particular results in terms of partisanship or race. As a consequence of providing the four areas of background knowledge, we anticipated that students would be sensitive to the history of the state and its current representatives, and that students would be able to defend the lines they had drawn in both theoretical and practical terms. Ultimately, we do not know if students kept all of the background material in mind when they drew districts, but at the least they had the ammunition to defend what they had done if challenged.

DRAWING MASSACHUSETTS' CONGRESSIONAL DISTRICT LINES

The actual line-drawing exercise had three components. Each component consisted of a congressional district map, an eight-to-ten-page narrative describing the map and the process of drawing it, and presentation slides describing the map and the individual districts. Collectively, the three components were worth 50% of each student's final grade. First, as we waited for the 2010 census

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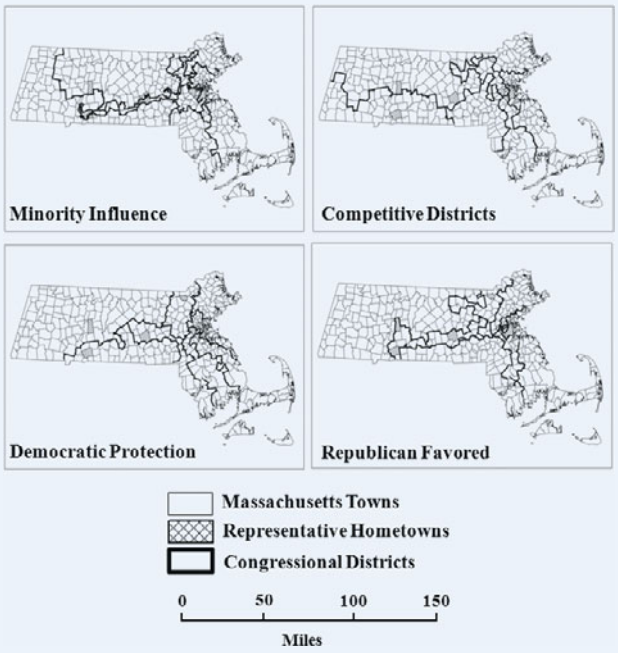
Figure 1

Sample Student Gerrymandering Maps



data to become available, students drew maps using the 2000 data but eliminating one district. This helped students become familiar with the software and with the line-drawing process. We divided the class into five groups, and we asked each group to start in different parts of the state—for instance, one group began in the western part of the state while another began with Cape Cod in the southeastern part of the state. Students were given data on population from the 2000 census and voter registration information from the 2008 Massachusetts elections, both of which were aggregated to the town level from census block groups and voting precincts, respectively.[8]

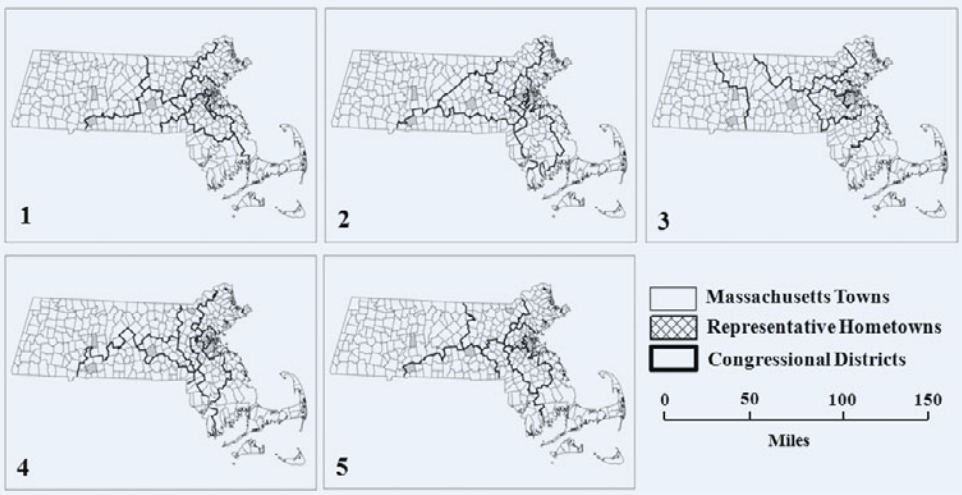
When the 2010 data were available, the student groups drew a second set of maps, aggregating precinct-level (2,157 Massachusetts precincts) data into districts. They were required to maintain the state's minority influence district and to avoid splitting cities or towns when possible. They were, however, given a small permissible population deviation (0.25%), which required them to split some municipalities. Each group received a different scenario: one group drew a map that helped Republicans, another drew as many competitive districts as possible, another drew a map that protected incumbents, a fourth drew a map that helped the Democratic Party as much as possible, and a fifth group drew a second minority influence district.

Figure 1 shows examples of these maps. Like most states, Massachusetts has a higher percentage of Democratic voters in its major cities and in its college towns. Our student groups, working independently of each other, reached similar conclusions about redistricting plans that would substantially advantage one party or group. Of particular note is the similarity between the minority influence map and the Republican map: both maps make similar efforts to connect disparate minority populations in Worcester, Springfield, and in Boston and several of its suburbs. A second interesting comparison is between the map aimed at maximizing competitiveness and the Republican map: the state's distribution of voters makes it difficult to create a single Republican district, but a map aimed at maximizing the chance of electing one or two Republicans is noticeably different from a map aimed at creating three or four competitive districts. The competitive map requires spreading out Democratic voters, while the Republican map requires that they be packed into a few districts. The students' Republican map goes a bit further, forcing several incumbents into the same districts to increase the number of open seats. Finally, the comparison between the Democratic map and the map in place from 2002 to 2010 (shown in the appendix) is noteworthy: it shows that a map aimed at helping Democrats generally, irrespective of current incumbency, looks different from a map intended to protect the state's current Democratic delegation.

Finally, the groups were asked to draw what we termed "good government" maps—maps that they thought were in the best interest of the state and to explain why. This exercise gave students several opportunities: first, to explore the trade-offs between compactness, continuity of representation, and the representation of communities of interest; second, to treat minority communities fairly without drawing districts that would look oddly contrived, and third to treat the parties fairly in a state where one party has traditionally been somewhat better represented than its numbers in the population might suggest. The resulting maps are shown in figure 2.

Figure 2

Sample Student "Good Government" Maps



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Although the most important feature of the maps in figure 1 is their contrasts, the most noteworthy aspect of the maps in figure 2 is their similarity. For four of the five maps, the decision boiled down to which geographic community would be slighted as the state lost a district. Two maps combined Springfield and the Berkshires, one combined Worcester and Lowell, and one combined two Boston districts. Two maps also created a new district whose major population centers would be Fall River and New Bedford, cities in the southeastern part of the state that had previously been in separate districts. Students also differed in their treatment of Cape Cod: in the 2000s the Cape Cod district had extended up to the south of Boston. In three maps the Cape district is more compact, and one divides the southeastern part of the state horizontally.

The ArcGIS software enables students to easily produce a variety of simple graphs and tables that complement the maps they draw. We provided students with census data on race and with precinct-level data on voter registration.[9] Other political data could easily be given to students—for instance, voting in the most recent presidential, gubernatorial, or senate elections. We also explored adding data on income or employment. The race data are needed to ensure the constitutionality of districts, and the voter registration data provide the clearest insight into politicians' choices, but the meaning of these data is open to interpretation and can prompt student discussion about, for instance, the wisdom of combining different minority populations or of considering the allegiances of different types of voters.

As noted earlier, the Massachusetts legislature's Redistricting Committee held hearings across the state and encouraged citizens to submit testimony. When the class was completed, the students' "good government" maps were submitted to the Committee as testimony.[10] We did not submit one specific recommendation; the five maps we submitted varied, and we did not suggest a "best" map for the state. Rather, these maps provided points of comparison for analyzing the maps proposed by the legislature or advocacy groups. Our students obviously had no actual stake in the redistricting process and were required to present detailed statistics on their districts and justifications for their choices. The actual players in the process have their own interests and are *not* required to be clear about their choices. For instance, in the weeks following the completion of our course, a group named Fair Districts Massachusetts released two maps (Bierman 2011). The group's leader, Jack E. Robinson, insisted that these maps were "a truly independent and historic effort."[11] Whatever the motivations or interests of Fair Districts Massachusetts, we found it very interesting that one of our student group's maps ("Good Government" Vision 3) bears a strong resemblance to Fair Districts Massachusetts "Plan B" map. Both efforts produced districts that are more compact and arguably more aligned with communities of interest than the current districts. We do not argue that our students' maps or other "outsider" drawn maps are superior to those produced by politicians, but we contend that including mapping efforts by citizens without a stake in the process, but with an understanding of the normative issues, can only improve our understanding of everyone's proposals.

OUTCOMES

One of our goals was to explore how easy it is for relatively well-informed citizens to draw district maps. We were satisfied that, as of 2012, anyone can draw district maps, but a reasonable amount of political knowledge is required to draw realistic, defensible maps. Based on our experience, we concluded that it is possible to provide this knowledge to undergraduates in a semester-long course.

Our students clearly were influenced by claims about "communities of interest" in the literature we considered. We explored a variety of different potential communities, looking at major industries within the state, concentrations of ethnic groups, media markets, and the location of major public works projects. Most students recognized, however, that "community of interest" is a vague term, and many were receptive to Thomas Brunell's (2008) argument that the only communities of interest that should matter in the redistricting process are Democrats and Republicans. In reviewing Massachusetts' old district maps students learned that some parts of the state had always been grouped together and that these groupings frequently corresponded to self-identifying regions of the state (e.g., the North Shore, the Merrimack Valley) or to the state's larger cities and its suburbs (e.g., Springfield, Worcester). Today, more communities of interest exist in the state than there are districts. During the semester, several newspapers published articles about saving particular congressional districts—residents of the Berkshires (at the western end of the state) argued that they were different from residents of Springfield (the largest city in western Massachusetts) and, thus, should have their own district (Davis 2011); residents of Worcester argued that they were different from residents of Springfield or Lowell (Monahan 2011); and residents of the state's North Shore, as well, argued that they were different from their neighbors (*Newburyport News* 2011). Much of this, of course, is self-interest, but students generally made reference to the history of particular areas of the state in explaining the choices they had made. Figure 3 shows two such explanations.

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The students' "good government" maps also demonstrate their receptivity to the argument that compactness is a valuable attribute of districts. Although students generally accepted the claim in the literature that compactness is a concept difficult to capture with mathematical precision,[12] a quick visual comparison reveals that all of the students' maps avoid the most blatant gerrymanders of the Massachusetts map in place from 2002 through 2010, where thin, north-to-south slices of the southeastern part of the state are each tethered to larger population centers to the north.

Our students surprised us in several ways. They were notably sympathetic to incumbent members of Congress, especially in their

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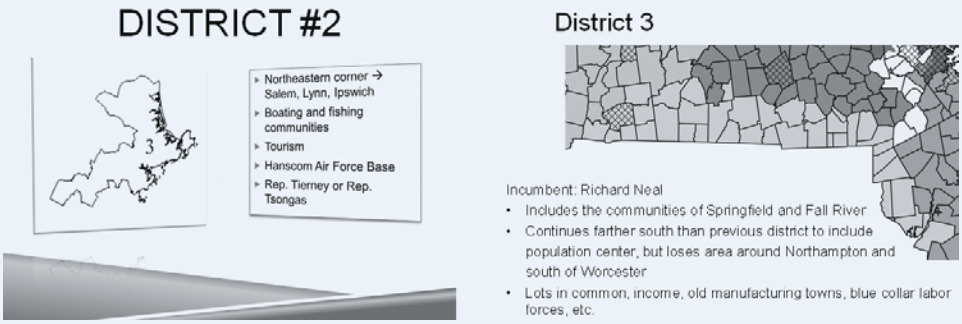
Figure 3

Sample Student Explanations of Districting Decisions



explanations of what they were trying to accomplish. This may be an artifact of the fact that the Massachusetts delegation is Democratic, and our students tended to be Democrats as well. In their explanations of their choices, however, students drew on literature on incumbents' "home styles," making reference to the connections between representatives and their constituencies, the extent to which representatives "fit" their districts, and the efforts that particular incumbents had made to help their districts. Eleven of our 14 students believed incumbent protection should be a primary concern in redistricting. They provided reasons that emphasize district benefits: "Incumbents have experience and clout in Washington. These advantages translate into benefits for the state as a whole."

We found differences between students' stated intentions and their maps. Because Massachusetts was losing a seat, at least two incumbents would be forced into the same district, but many plausible maps would combine more than two incumbents.[13] If we take incumbents' residences as evidence of where they would run, two of our five maps created a pair of incumbent-incumbent races, two others created three incumbent-incumbent face-offs, and one map created a three-incumbent district. It is unlikely that a Democratic legislature would choose to complicate the lives of so many incumbent Democrats, and indeed the Massachusetts legislature did not do this in its final map (also shown in the appendix). However, more than half of the "good government" districts our students drew made only modest adjustments to current lines, and such districts appear to be safe for their current incumbents. The students clearly did not subscribe to the view that new lines should be drawn to actively encourage turnover.

Correspondingly, our students did not tend to prioritize competition. Nine of our 14 students argued that competitiveness should not be a major concern, although some argued that it should be more of a concern in states that had a more even partisan balance than Massachusetts. Most students told us there should be a few competitive districts, or that having some "doesn't hurt," but they tended not to emphasize competition: "Legislators should make a few competitive districts, but too many such districts would be disruptive." "Competitive districts generate interest and therefore higher voter turnout, however there may be too much turnover."

Furthermore, the students were remarkably unsympathetic to independent commissions drawn districts. We discussed, at length, the way the redistricting process works in Iowa and New Jersey, and we studied the drive in California to create a nonpartisan commission. At the end of the course, only three of 14 students said that they favored independent commissions over state legislators. As one student remarked, "State legislators are currently the best choice for redistricting. They're simply more knowledgeable about all the issues than a commission."

At the end of the class we asked students if all of the subjects we covered in the class were helpful in drawing district lines. All of them responded that the legal, theoretical, and institutional material on Congress was useful in drawing districts; most referred to this literature in their narrative accounts of their maps. The most difficult aspect of the class was familiarizing themselves with different communities in Massachusetts. Students generally began with a notion of the difference between regions of the state and with some ideas on the value of different incumbents. Many remarked, however, that they had some difficulty deciding what to do with small towns at the edges of their proposed districts. As one student remarked, "Generally I had an idea, but I'm sure that I made unnecessarily controversial decisions somewhere on my map." These decisions are often the subject of citizens' comments at public forums; at the forum held at Clark, several citizens remarked on the history of various towns and the reasons why they had always been grouped with other towns. Some students used information on media markets in drawing their maps or inquired about using census data on employment patterns or other factors in making these decisions. Many students also admitted to doing what we suspect state legislatures also do: shifting smaller towns around to achieve smaller population deviations between districts.

On the whole, we were struck by how the mapping exercises required students to grapple with and use the concepts they encountered in the scholarly literature. The census and political data students used in drawing their maps made "community of interest" real. Reading about the "packing" or "cracking" of voters or the use of "filler people" is not as effective as actually engaging in these practices when drawing one's own district maps.

The redistricting process is undeniably one in which much is at stake, and in which decisions are often made with little public scrutiny. We contend that the maps our students drew likely pose less of a threat to the Massachusetts delegation than one might expect from any sort of independent commission. Whether this is good or bad is subject to debate, but it does show that bringing outsiders into the process is not necessarily as disruptive as some might expect. The students' careful balancing of incumbency and the protection of existing district lines with other districting principles is important because it shows that students can be constructive players in the redistricting process.

GENERALIZING FROM OUR EXPERIENCE

It is possible and valuable to devote a semester to teaching students about redistricting. The software and data now available in this round of redistricting enable students and citizens to play a meaningful role in the process that was not possible in 2000. Of

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course, many other strategies exist to teach the subject, and our experience, in many ways, is particular to the nature of the institution where we teach and the state where we reside. Here, we reflect on how our course differed from what others might do and how one might teach a redistricting course elsewhere.

First, we taught this course in this way because the state's census data were released during the semester and the Massachusetts legislature began its public hearings while the class was offered. We could envision teaching a course later in the year than this; a class taught earlier would need to use the previous decade's census data or to use estimates based on the American Community Survey (ACS). If ACS data were used, students might get a sense of changes in the state's population, but the ACS data are sample estimates and cannot be used to draw lines. Partisanship and voting data, in contrast, are generally available (depending on the state) promptly after an election. Thus, considering changes in voting over the decade given a different set of district lines has merit, but as a hypothetical exercise it may not seem as valuable to students.

Second, Massachusetts is entirely controlled by Democrats, and there are only a few ways to draw the state's districts to aid Republicans. Considerations in other states will be different. Because the maps produced by the legislature will not be affected by deal-making between parties, students can consider issues other than partisanship. Although redistricting is unabashedly political, the outcome of this round of redistricting in Massachusetts did not produce the furor that occurred in other states such as Illinois or Texas. The state's peculiar politics took some of the partisan politics out of the process for students and instead forced them to grapple with other issues, such as intraparty disputes and regional differences.

In Massachusetts, some controversy over the representation of minorities in Congress exists, but this was not a serious issue in our mapmaking—ensuring that the lone majority-minority district maintains its population still allows for substantial creativity in drawing the rest of the districts. Racial politics would place substantially more constraints on student mapmaking efforts in other states. We are not convinced that this has much impact, however, on the sorts of lessons that can be learned through a course like this one. Any class on redistricting certainly will spend time on literature concerning race and redistricting, and lessons can be learned from this literature regardless of how much it influences any individual state.

Massachusetts also experienced conflict over the loss of one congressional district during the semester we taught the course. This sort of conflict clearly exists in other states losing population such as Ohio, New York, or Louisiana. A different conflict also clearly exists in states that are gaining one or more seats; recent articles on the process in Texas, Florida, and Nevada describe the competition among different groups or areas in explaining why they should be privileged in the state's redistricting.[14] This course may be best suited to states that are gaining or losing a seat, or in states where redistricting is expected to substantially alter districts, either because of population shifts, a past history of gerrymandering, or change in party control of the legislature. This expansive definition, however, may include most of the larger states in the country.

Massachusetts is also a good-sized state for this project. Students reported spending substantial time drawing districts, and the class would have suffered had we reduced the information we provided to them to allow more time for mapmaking. Most likely, a class devoted to drawing much smaller states would be less exciting, and a class where students drew maps for large states, such as Texas or California, too demanding. Most students claimed they would find mapping a state the size of Texas or California daunting. The optimal size, according to our students, ranged between six and 15 districts. Virginia colleges have had success in having students draw maps, which supports our claims—Virginia, with 11 districts, uneven population growth in the state, and a 2000 map that is widely considered to have been a Republican gerrymander, seems another good candidate for a redistricting project.

We considered having students draw districts for other states. This would have required substantial instructor preparation: downloading census data for these states, educating ourselves about the redistricting process for each state, and merging partisanship data with census data. It would also require students to acquire information on the state where they are to draw lines. This exercise would be valuable but would require much extra work.

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Third, we were fortunate both to have a small class size and to have the resources an institution such as Clark University provides. On the one hand, Clark has an excellent graduate geography department, which ensured that adequate software was available to students and that faculty and graduate students were well trained in the use of GIS software and the display of mapping data. Teaching the course without the assistance of a graduate student trained in GIS software would be difficult. Not all schools have such resources available. On the other hand, like many other smaller schools, Clark is committed to offering an undergraduate education that emphasizes research, interdisciplinary study, and "hands on" student projects, all of which were important elements of our course.[15]

We hope that some readers will save this article and revisit it when the 2020 redistricting comes around. However, teaching the subject now has value; although we spent a semester preparing for this course, some instructors could pull together the relevant materials more quickly than we did. Even if one is teaching redistricting in a state where legislators have completed the process, or when the first elections are taking place in newly redrawn districts, these sorts of exercises give students a better understanding of what has happened. A redistricting course may be hard to sell to students in 2016, but it is likely to be relevant right before or after a redistricting. Redistricting can be taught in a variety of

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courses, but one should be careful to ensure that students learn a substantial amount about the state where they are to draw lines. The task is not simply to draw lines that are legally compliant, but to draw lines that respect the history, culture, and politics of the state—lines that can be taken seriously. This is a tall order, but we believe that it is now possible, and it will be easier in decades to come. ■

NOTES

1. See http://www.worcesterma.gov/election-results/2000-2009/20081104.pdf.
2. Examples of teachers who have done this include John Korey of California State University, Pomona, who taught a course in the spring of 2010 in which undergraduate students were asked to develop a redistricting plan for a fictitious state, and McGill University geography professor Benjamin Forest, who assigned redistricting exercises to students already trained in the use of Geographic Information Systems (GIS) software. Political scientist Mark Rush and information technology expert John Blackburn also taught a class at Washington and Lee College in 2002 that used GIS to draw state senate districts. When we were teaching our course, Columbia University law professor (and redistricting consultant) Nathaniel Persily taught a course to law students titled "Redistricting and Gerrymandering" in which students drew maps for all 50 states that conform to various scenarios, including minimal change to existing district lines, compactness, competitiveness, and representation of the state's overall partisan inclinations. Finally, several universities, such as the University of Arizona, have partnered with state governments to involve political science faculty and students in training sessions on the use of redistricting software. Students at several Virginia schools participated in a competition to draw districts for the state using the Public Mapping Project's software, and three other states have announced similar competitions (Mann and Ornstein 2011).
3. See http://www.esri.com/software/arcgis/extensions/districting/index.html.
4. This district, then MA-8, has been represented, since its creation, by a white Democrat, Michael Capuano.
5. For a full summary of Massachusetts redistricting laws, see http://www.malegislature.gov/District/Laws.
6. A good summary of the 2000 redistricting is provided in Moscardelli (2002). Although Finneran was not successful in his initial plan, Moscardelli contends that the House Speaker was successful in dictating the broad outlines of the redistricting plan. Finneran later pled guilty to charges of obstruction of justice for falsely testifying about his role in the redistricting process when he appeared as a witness in a suit related to racial discrimination in the drawing of the state legislative districts.
7. Our syllabus is available at http://www.clarku.edu/research/mosakowskiinstitute/portfolio/index.cfm
8. These data were culled from *Massachusetts Election Statistics 2008* (Public Document No. 43; Elections Division, Office of the Massachusetts Secretary of State).
9. Massachusetts allows citizens to register as "unenrolled"—essentially, to proclaim themselves to be independents. These voters are permitted to request the ballot of any party in a primary election without changing their registration status. The allegiances of unenrolled voters are a subject of frequent discussion in Massachusetts politics. Given the anemic Republican registration totals, unenrolled voters are generally crucial to the success of statewide Republican candidates.
10. The testimony is available at http://www.clarku.edu/news/Redistricting_testimony.pdf.
11. See http://www.fairdistrictsmass.org/index.htm.
12. See, for example, Young 1988, Monmonier 2001, 64–76.
13. The state's final redistricting map would have created two such matchups; ultimately one incumbent chose to move and another retired before the final map was released. A third incumbent retired after his district was redrawn, creating one open seat.
14. For examples here, see the *Washington Post*'s "Mapping the Future" archive, which collected analyses of the process as it unfolded in various states, at http://voices.washingtonpost.com/thefix/mapping-the-future/.
15. Clark University's undergraduate curricular initiative, known as Liberal Education and Effective Practice (LEEP), is described at http://www.clarku.edu/aboutclark/LEEP/

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APPENDIX: Massachusetts Congressional District Maps

Figure A1

Massachusetts Congressional Districts, 2002–2010

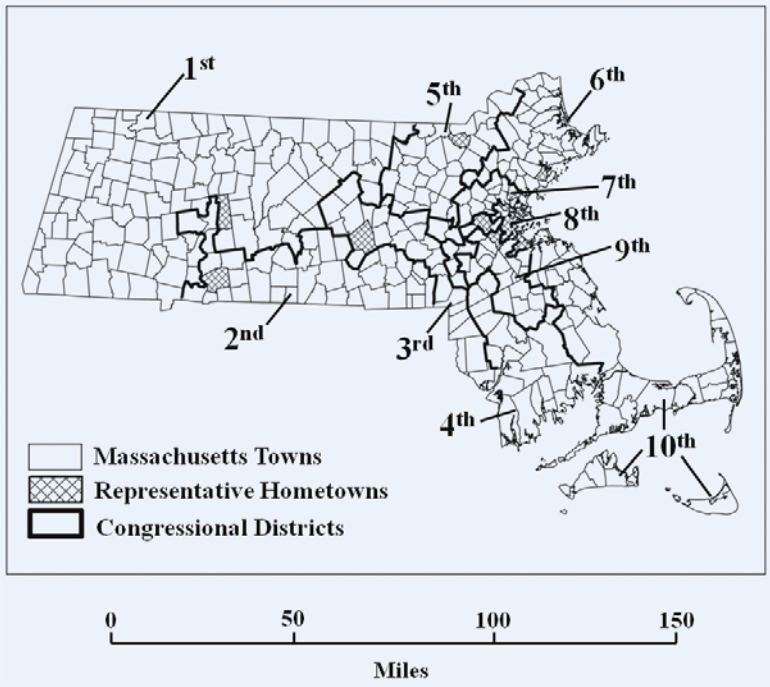
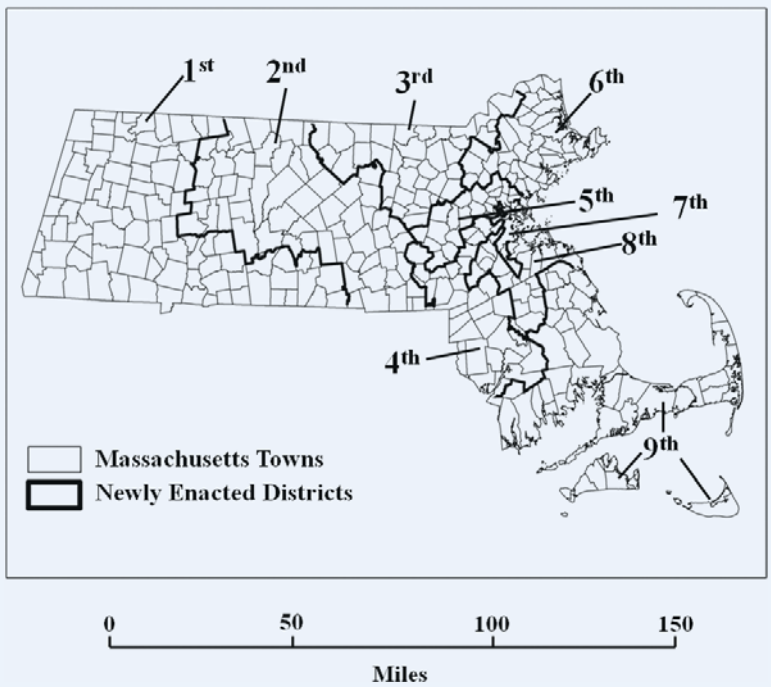


Figure A2

Massachusetts Congressional Districts, 2012–2020



Source: Massachusetts Special Joint Committee on Redistricting, http://www.malegislature.gov/district; map adjusted by authors to show representatives' home towns.

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