#DLFteach • #DLFTeach Toolkit: Lesson Plans for Digital Library Instruction

Social Inequality with ArcGIS Online

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Session Specifics

Faculty collaboration, including 2 in-class sessions and an assignment

Instructional Partners

Disciplinary faculty instructor

Audience

18 undergraduate students from many majors enrolled in Sociology 209: Social Inequality

Curricular Context

I collaborated with a sociology faculty member to develop this lesson and assignment for her Social Inequality class. I reached out to her in an effort to spread GIS use beyond the natural sciences. We decided to introduce spatial research during an in-class exercise and let students build their skills through a group project (assignment attached). During class, we used ArcGIS Online to calculate the percentage of Boston's residents that live with a ten minute walk of the subway, broken down by race. It illustrated visually and quantitatively that white residents enjoy much better subway access than black residents. In a second class session, we discussed a historical mapping Digital Humanities project. For the final project, students worked in teams of 3 to prepare a 20 minute presentation on a particular aspect of social inequality in Boston (housing, transportation, etc). While this lesson focuses on Boston, it can easily be adapted to other topics and cities.

Why ArcGIS Online?

In a class setting, ArcGIS Online has several advantages over the desktop version. Because it is browser based, it can run on any computer, even a Chromebook. The desktop version requires a powerful PC (does not work on Mac) to run well. Using a browser-based tool helped eliminate access issues for many students. The online version is simpler, which worked out for a basic, introductory project. The students finished the in-class exercise and their assignment without needing the more robust tools of the desktop version. The Groups feature in ArcGIS Online made it easy for me to share data with the class and for them to share progress with each other.

Learning Outcomes

1. Introduce students to quantitative sociological research methods
2. Gain comfort and expertise with ArcGIS Online
3. Find and evaluate data sets
4. Visualize spatial aspects of inequality

Preparation

- A few days before the lesson, make accounts for everyone in the class in ArcGIS Online. Have the faculty member tell them to expect the email and activate their accounts.
- Create a class group in ArcGIS Online to share data
- Preload relevant data for the activity to the group - The class group made it easy for all of the students to quickly access the dataset we used in class. I also added some basic data sets from our state's GIS portal to get the groups started on their topics. All of the groups found additional data to use in their presentations. You can decide how much data you want to give them. I wanted them to be able to start playing around with their topics before facing the struggles of finding and uploading data, but it may have been too much coddling.
- Create documentation for the lesson - I screenshot each step, as attached. Maybe that level of detail and pre-work was unnecessary, but I feel like it kept the class running smoothly and let students go back to missed steps without interrupting the lesson. Additionally, it has been convenient to have a complete tutorial to hand off to curious students, staff and faculty.

Materials

- Session instructions (document in Additional Instructional Materials below).

Session Outline

Lesson 1: Hands-On Tutorial

Over a 70 minute class period, we worked through the attached tutorial with discussion breaks. I prepared the following discussion questions in advance, which did a good job of sparking conversation:

Before we start:

- Who has used quantitative sociology methods before? In what contexts?

- Thumbs up/thumbs down on comfort level/nervousness
- Why is public transportation important? Which groups does it most effect?
- Based on what you've been discussing in class, what could lead to unequal development in public transit?

After step 6:

- What is your first impression?
- What can this map show us? What can it not show us?
- What information would make this map more interesting?

After step 11:

- Have your impressions of the map changed? (Get them talking about how this visualizes housing segregation.)

During step 15:

- Have your impressions of the map changed?

Final discussion questions:

- Final impressions of map?
- Does the visualization enhance understanding of transportation and housing inequality?
- What are the consequences? What does this mean for residents' day to day lives?
- What do you think of mapping as a research method? How does it compare to other sociology research methods?
- In what situations would this kind of evidence be most useful? (The students talked about presenting at meetings for policy changes, funding, etc)
- How would you combine this with scholarly literature? Interviews?

During our discussion, two students spoke up about their personal experiences growing up in Boston. One lived near a subway stop and was surprised to realize the level of transportation inequality that existed in her own neighborhood - she hadn't noticed before. Another student grew up in one of the neighborhoods without subway access and talked about how hard it was to get to her magnet school in a different neighborhood.

Lesson 2

I returned the following week. For homework, the students reviewed [University of Richmond's Mapping Inequality project](#), visualizing the “security maps” produced by the Home Owners’ Loan Corporation during the 1930s.

For the first 20 minutes of class, we discussed the project. I prepared some questions to start the discussion:

- How many of you immediately went to your home cities? What did you notice?
- What can we learn from the historical data?
- What research questions can be investigated using this source?
- If you wanted to study the long-term effects of redlining and its repercussions on housing today, what kinds of sources would you need? Who collects that information? How would you find it?

For the rest of class, the students met in their groups while the professor and I went around and helped the students brainstorm, form topics, and talk about what data is both findable and mappable.

Assessment

Student Feedback:

We administered a post-presentation assessment survey, and the student feedback was helpful and informative. Most feedback was positive, but a few students wished they had done more mapping in class before beginning their projects. Others complained about how broad the assignment was, but that was intentional to force group topic narrowing and decision making.

Some of my favorite student comments:

“Moreover, my experience with technical analysis this time also taught me to bring a critical mindset to notice the limitations within my research. As I had more experience with mapping, I gradually became used to asking myself these questions prior to making any kind of conclusion: What does this map contain? What can it reveal? What can’t it show? ... By projecting the social inequalities onto maps, I felt that those previously seemingly far-away inequalities suddenly became relatable. A new understanding of ‘we are experiencing inequalities every second everywhere’ emerged.”

“This project helped me learn more about the policies that affect accessibility to healthcare, and how even when policies are made to help correct inequality, they often fail to completely fix the problem they are attempting to. I also became much more comfortable with using the ArcGIS software. I was very nervous about using the tools to spatially represent inequality at first but found that the maps were a great way to show this.”

“The spatial dimension of this mapping project helped me see how much variation there really was within a geographical area for any given variable we plotted. I realized how much information about this variation is lost when we look at big-picture averages that lump smaller geographical units together as a whole. The opportunity to map different layers of variables upon one another reinforced for me the manner in which inequality is truly intersectional, and how inextricable one layer of analysis is from the other.”

“The biggest thing I learned when working on this project was how to use and interpret information using ArcGIS mapping. I had never used this technology before and found it useful for providing evidence to support background information concerning violent crime, race, and income in Boston. Since I am a visual learner, I found the maps useful and interesting since they physically displayed these features. Although I was somewhat familiar with modern segregation in Boston, learning how racial and economic disparity intersected with crime rates has helped me understand how severe social inequality is in Boston.”

Reflection

Challenges

This was not listed as a quantitative or data-driven course, so students were not necessarily anticipating a data visualization project. While talented and ambitious, Wellesley students are often hesitant about working in new areas if it affects their grade. Some students were initially hesitant about working in ArcGIS Online. Despite their misgivings, the final projects were all high quality and almost all of the feedback was positive.

Research Consults with Group

The students had 4 weeks to complete their presentation. During this time, I met with all 6 groups, some multiple times. Some students came as a full group, others

individually. It was a time consuming process. I now have a GIS student worker who can handle the purely technical questions in the future, but most of the consults focused on scoping, finding data and other sources, etc. Had the class been much larger (it was 18 students), managing support would have been difficult.

Implementing in other institutions

Wellesley is a small liberal arts college with a focus on individual attention and boutique service. In this environment, it made sense to devote a lot of time to one assignment. In my role as both a GIS Instructional Technologist and a Research and Instruction Librarian, I provided multifaceted support to students in all stages of the research process. With a larger class, it would be helpful to have support coming from multiple staff members. Alternatively, this project could be scaled down by only doing the in-class exercise and not the group presentations.

Additional Instructional Materials

Handout

[Session instructions](#)

Assignment

Soc 209- Mapping Inequality Group Project

Assignment Objectives—By completing this assignment, students will:

- Critically examine the ways that social inequalities take shape in space
- Work in a collaborative team
- Interpret GIS data to analyze social inequalities in Boston, MA
- Communicate work using visual media and public speaking

Assignment:

Working in your assigned team, use ArcGIS to analyze a particular aspect of spatial inequality in Boston, MA. Specific topic areas to be covered are housing, public transportation, environment, education, criminal justice, and health. Each team will collaborate to shape inquiry within its assigned topic, investigate provided data, locate additional sources of data, construct maps, and plan a 15-20 minute presentation to the class.

We will have a dedicated work day to begin this assignment on March 8. Teams will need to schedule additional time to work collaboratively on the project outside of class.

Group presentations of this project will be given in class on April 9 & 12.