A collection of reflections from secondary and college teachers who have taught with ArcGIS online for the first time

Reflection 1

My overall assessment of this project is that I bit off more than I could chew. I had hoped that the students would be able to do some great GIS analysis related to the home locations and other demographic data about [a group I'm interested in], and I was able to obtain a good dataset [from the group] for use in the project.

However, I did not anticipate the difficulty of using this data in ArcGIS Online. I failed to recognize that AGOL is limited to analyzing 1,000 points of data; my dataset had many thousands of features. I also did not realize how hard it would be to geocode a dataset of that size. Ultimately, I ended up using a dataset that was geocoded only by zip code, rather than actual home addresses, which greatly reduced the effectiveness of the analysis.

On the positive side, many of my students seemed genuinely impressed with AGOL and the possibilities of GIS analysis in general. Most had had no exposure to these topics, and a number remarked on how "cool" they seemed to them. I remain optimistic about the possibilities of using GIS in the social sciences, and hope to develop a more feasible lesson plan for doing so in the future.

Reflection 2

This project was implemented with a high school ecology class that was comprised of eight special education students, and another eight students who were low performing students. I knew going into the project that many students would need extra help with working through the ArcGIS program, but was hopeful that the novelty of the program would captivate and motivate some of the students. Unfortunately, I never obtained administrator privileges that would allow me to set up my own groups so that maps could be shared easily. I took the precaution to write down each student's login name and password, knowing that many would not write them down and would forget. Because I did not have a way to invite students to a group, students had to sign up for the free trial use of ArcGIS. This proved disastrous later when the trial use ended and students could not create another account. Most of my students only have one email, and ESRI recognized the emails as already used. Some of the students tried to forge ahead on setting up their own personal accounts, and then could not get logged back on because they didn't follow steps properly. As a result, students who did get logged on for a free trial had to save their maps, then email me a link to the map. I had to open each student's map and insert their pushpins and data onto a master map, then send that link back to them. This required too much time and students quickly lost interest in the project.

The students loved the opening activity where they found their own homes on the imagery map, and placed pushpins on their homes. They were very interested when I had them add the FEMA 100-year flood plain layer and realized that most of the houses were within the flood plain. If I were to do this again, I would stop having students work with the ArcGIS program at this point, and show the class the composite map using an overhead projector. The program is great for presenting teacher-made maps, and probably good for self-motivated, higher achieving students at the high school level. It is too cumbersome for students who struggle with processes that must be followed within definite sequences. Perhaps with administrator privileges and quicker sharing of layers, data and maps, this could have been more appeasing to my students. As this project went, it was very frustrating for most of my students.

Reflection 3
This project was initially intended for an online course, but was used instead during a traditionally taught class due to logistical issues as well as an opportunity to try a new teaching style in the classroom. For this semester, I chose to use a modification of the "flipped classroom" model with this course. I thought this particular model worked quite well with the scope of this project because we had more classroom time to devote to working through the activities than I would have had otherwise.

I have used the basis of the project in class before, but used the geospatial technology much more extensively. I created a number of activities to be used throughout the semester to gradually introduce the students to geospatial technology and the ArcGIS online environment specifically. This method, I believe, created more comfort with the students. Particularly for students in the classroom, there is often a technology literacy gap or even for some a fear of new technology. Because they used it numerous times, with detailed instructions and me to help, they were much more comfortable by the end of the semester.

The question sets I provided with the activities may stifle creativity for some students, but I felt overall they were good to make sure that students were able to see what the important concepts were.

If I were to use this again, I'd create more of these question sets for each topic in the class. In retrospect, I'd like to use ArcGIS more when they went into their final presentation and question sets. They still tended to revert back to Googling for information when the map-based data was far easier to see. Specific activities for each topic would likely help this issue.

I'd also like to have them find more data, particularly geologic maps for identifying rock types. This seems to be a weakness in the project as a whole.

Reflection 4

The first semester I dove right in to having the students create a story map. It was a disaster. The technology didn't work correctly, and the students became highly frustrated trying to get their ideas into ArcGIS. So, for the second semester, I started simply by showing them the "enrich data" function in AGOL, and giving them some time to explore the numbers they discovered and discuss them as a group. We used the enrich data functions for two assignments before I ever introduced the idea of the story map as a communication tool. At that point, they were already comfortable with the software, and no longer aggravated by the process. They dove right in!

It would be nice to have more information about what particular results mean when using the enrich data capabilities. I had to do a large amount of research to be ready to answer student questions when they got results that were possibly unclear. One solution would be to ask students to all run the same analyses for a lead-in assignment, and then discuss the results together. As I currently have the assignment, each group is responsible for determining what questions they want to ask, which means I have a potentially unlimited number of different types of results to interpret.

Reflection 5

I originally presented this lesson as part of an immunity unit. After some slight modifications, I then presented it as part of a microbiology lesson.

- Some students loved the lesson, some students hated the lesson, and the majority of students did not seem to have a strong opinion on the lesson.
- I think the lesson was too long, especially since it was very guided/directed. I think the length would not be a problem if I could convert the end of it to make it more open-ended inquiry to let students search for their own maps. I was originally worried about the computer skills of the students, and this was a challenge for some, but overall, most students were able to navigate through ArcGIS Online and the internet with minimal coaching from me. So, I think asking them to find their own maps would not be a huge issue for the majority of the class. Although, I think the guided inquiry was good, especially at the beginning because I think the students would have been lost/frustrated without it.
- I need to do a quick review/lesson of the following concepts before starting the lesson or include this information as they are navigating the lesson:
  - The difference between a country and a continent
  - Basic geography
  - Ways that viruses can be spread
  - A current news story about a virus to make it relevant to current events
  - Information about the spread of other epidemics around the world
- I wish I could have devoted more time to the lesson so I could have the students be creative and use their critical thinking skills to look into more data and draw conclusions and possibly make their own maps.

- I will use this lesson or a similar lesson again in the future.
- One big problem with this lesson is that epidemics are constantly changing, so a virus may not be relevant in future semesters. I maybe should have chosen a more historically significant epidemic that could be used from semester to semester. Otherwise, I will have to update the lesson each year to make it relevant to current events.
- I think some of the questions on the worksheet need to be more specific in what they are asking for. For example, instead of asking students to identify areas of the world where this virus exists, I should ask them to specifically mention which continents, or countries where this virus is found. Some of the questions would require students to write down a lot of countries, so it may be better to ask for them to write down a specific number of countries that have this virus.
- I also should have done a better job of setting up the "driving question" to make the lesson more relevant to the students.
- Originally, the last question on the worksheet asked students to identify three maps that would potentially help an epidemiologist predict where this virus will spread to next. After seeing the students work with the program, I think it would be good to have them actually look up these maps and make a prediction by doing a writing assignment where they have to use data to back up their argument.

Reflection 6

I wanted students to collectively and continually add data to the map.I shared the map in the My Contents, not knowing that I also had to click on the "share" button at the top of the map site. A student actually clued me in and then we were all set for sharing.

One thing that I realized was that the spreadsheet could not be updated on the map site. Thus, my plans for students inputting data had to be changed. I did not want students to have access to the spreadsheet without me there helping (I could see something going wrong) so I had to work quickly with the data, get it inputted into the spreadsheet, and then upload the updated spreadsheet into the map. The trial run ran smoothly and I made some changes to the questions that I would ask about the map for [the following semester].

Updating and inputting the Excel spreadsheet data into the GIS map worked well for the trial run, but [the next semester], when I updated the spreadsheet and tried uploading it (I deleted out the old spreadsheet), I got error messages and I could not figure out the problem (the web was of no help to a novice GIS trouble shooter like me). On paper, I have big plans for GIS but I get bogged down with technical difficulties and no one to help me. And, since the time between data acquisition and putting it on the map is so short (literally two days to take new student data and get it ready for map layers), when I run into problems like this, I do not have time to fix them.

In my trial run, I was able to share the map with the link with no problem. [The next semester] however, I had to enter my login credentials to get the students to the site – this happened with laptops and tablets, but not phones. So, again, my lack of technology knowledge hampers me. However, all students did access the map and I quickly got them going. It was not a major glitch but I cannot understand how one semester I did not have this problem and the next semester, which should prove less stressful since the pilot run is completed, I ran into problems.

I also had problems with merging layers. Students in three classes uploaded their location data so we could see how many new data points we had. One class input their data under Map Notes and the other two classes input their data under Map Notes 1. I went to combine the Map Notes with "Manage Data" and "Merge Layers" but I found that some data dropped out of the picture. For example, we had two data points in India under Map Notes, but when I combined all of our data, these two India locations dropped off the map. Again, if I had enough experience with troubleshooting I could find a fix, but I couldn't so we just left Map Notes and Map Notes 1 and turned both of them on to see our current data.

I also wanted to run more analyses and queries. I tried extracting data and other things but I never got this to work and I ran out of time. I know it is something simple, but

when you have all of these other teaching duties going on, you just cannot free up a couple of hours to do these fixes.

Even with these glitches, which I think are probably normal for instructors who first start out using GIS, I am happy that we now have a digital map for this project and students are using the map (albeit a teacher-directed activity), which is exactly the goal for this short GIS project. Students actually interacted with the map, put data on a map, and answered questions that I could not have asked if I did not have the GIS map. In that respect, this project is a success.

At first I felt that I was cheating a bit by not becoming part of an Organizational Account, but I honestly do not need that complexity for this project. . . . I think AGOL has suited my purpose just fine and there is still much more that I can do with it.

I had another instructor come in and observe and she noted how the students were engaged with the map and how many students sat and fiddled with the map, looking at each layer, sometimes coming up with observations or insights that were not asked for. The mapping is truly engaging as long as students are not burdened with too many directions or a long list of "hit this button" and then hit "that button." I like how the students felt some freedom in terms of how to play around with the map. Because the mapping was part of the bigger project, I never felt like I was in a computer lab and leading students through a computer lesson – I gave them minimal instructions, modeled how to turn map layers on and off, gave them five questions, and turned them loose.

Reflection 7
Having completed the project I have identified a few key areas that need improvement. While some students were comfortable with the technology, there were a few that simply did not have patience to work through a detailed technical set of instructions. Students should be coached ahead of time on this issue.

There was also an issue with the quality of the products the students created. The student work products were not at a level I would consider appropriate …. I think this problem could be alleviated by showing students ahead of time the level of finished work product that is expected.

The instructions themselves, when followed, worked well and students were able to generate maps and extract data from them.

Reflection 8
Time was my number one constraint. My curriculum is outlined for me. This leaves very little time to "stray" from what I am supposed to be teaching. I decided to complete the project with this class because I have a little more leeway with their curriculum and it

was a much smaller class with only 6 students. Working with such a small number of students proved to be very beneficial, too.

I began by introducing students to ArcGIS online by creating a group and having them join. I then showed them various story maps and allowed them to explore some on their own. I had the students create a map of our state with 5 layers of their choice that were related. This proved to be both a challenge and a great learning experience for the kids to explore and experiment. They learned rather quickly and there were not that many frustrations. I then gave the students their rubric for the project and told them they would be making a story map to present to the lower level classes about [a type of health condition] of their choosing. Giving the kids a choice was a good idea because they took ownership of their project. One of my students' father died from [a health condition] so she was eager to learn more about it.

I originally wanted my students to look for variables on the CDC Wonder website to look for a correlation between their [health condition] and some environmental factor, but this proved too difficult as not all of the chosen [health conditions] had an environmental cause. I ended up just having them create a map that showed different variables, such as: age, mortality rate, ethnicity, and gender.

If I were to do this project over, I would like to make it more scientific than what it turned out to be. I would like the kids to gather their own data and input that data into a map. I didn't feel very confident with my abilities teach them how to do this and I wasn't quite sure which type of data they would collect.

The students were hesitant to learn how to make a story map and I often heard, "Why can't I just make a PowerPoint?" I explained to them that learning a new way to present material could give them an edge in the workforce and an employer might be very impressed that they have used ArcGIS. It made more sense to them when I explained it in terms of gathering data for advertising on billboards or where to open a shop based on demographic research. I would like to complete another project with this class next year, but I need more practice, myself.