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Small scale GIS: Adapting GIS Instruction in a changing world

Introduction

In March 2020, Northwestern University moved to a remote model for the spring quarter in response to the COVID-19 pandemic. While most private nonprofit, four-year institutions opted for primarily in-person instruction (Elias et al., 2020), Northwestern University elected to teach primarily online. Historically, we have held geospatial workshops in physical spaces, either in the GIS lab or small classroom, both housed in Mudd Library. When undergraduates and faculty leave campus for summer research, we have seen a decreased participation in our workshops (Table 1). Given the unusual circumstances of the pandemic, we addressed this situation by creating a pilot program of short, technique-specific workshops called *Small Scale Sessions*. The name, a play on map scale, helped us reconnect to undergraduates and faculty with interactive online instruction.

Table 1: Total number of summer quarter workshops and corresponding participants from 2017-2020.

Year	Number of Summer Quarter Workshops (July-September)	Total Number of Participants
2017	3	25
2018	7	87
2019	3	25
2020	11	104

While the pandemic disrupted workflows, it also created the opportunity to re-imagine and re-structure support of GIS at Northwestern University. This article intends to provide a background of our GIS services at Northwestern University,



how COVID-19 altered them, and how we adjusted our summer instruction. Re-envisioning our longer, traditional introductory workshops into shorter, more pointed sessions proved to be a successful endeavor. We believe this change can have similar success at other institutions experiencing comparable circumstances.

Libraries are impacted by external events, both locally and globally. Despite this, libraries remain some of the most flexible and innovative spaces, capable of changing and realigning support for students and faculty. Wenborn (2018) notes the incorporation of modern technology into academic libraries to adapt to the needs of patrons. This change especially holds for GIS librarians and specialists, often trained in more than one software and data management practices. Libraries often approach issues through physical and digital means, allowing us to adapt to short- and long-term stressors. In the case of COVID-19, while physical lending slowed, libraries saw increases in digital loans and e-book requests (Wilburn, 2020). Mirroring the demand for digital loans, we recognized an increased need for virtual GIS assistance as well. Our unique way to respond to the long-term stress of the pandemic was the development of our Small Scale Sessions.

GIS at Northwestern

GIS support at Northwestern University is a relatively new accommodation. Like most academic libraries, the inception of GIS services at Northwestern was an extension of long-standing cartographic collections. Today our cartographic collection, housed in University Main Library (one of three libraries at Northwestern), includes maps, atlases, nautical charts, globes, and World War II ephemera. In 2010, GIS gained more independence from its association with the cartographic collection and began supporting students, staff, and faculty on GIS projects. We offer a range of GIS services, from one-on-one research consultations, embedded classroom instruction, data trouble-shooting, and multiple GIS specific workshops throughout each quarter.

Before COVID-19

Before the outbreak, student and faculty research support happened in physical spaces. Typically, researchers preferred to discuss projects in person, with faculty usually in their office and students dropping by our offices. We have made several attempts to offer in-person workshops during the summer, yet signups and attendance have been low. Ultimately, it was more efficient to cancel the summer workshops and meet individually to tailor the instruction to their needs. We offered



virtual assistance, as well. Yet, few took advantage of that assistance. The contrast between virtual and in-person assistance is evident when considering in-person workshop attendance throughout the fall, winter, and spring quarters.

The current environment (during COVID-19)

Within the last six years, attendance at workshops has been at record highs, led by dedicated geospatial staff in the Library. As we considered what summer instruction could look like, given the struggle of low attendance, we decided to develop shorter GIS sessions focused on specialty topics such as bivariate choropleth mapping and georeferencing. Re-structuring, our workshops provided a means to increase participation in learning opportunities offered by the Library. This change also added a creative outlet for us to connect participants with advanced geoscience concepts.

All geospatial and data services have transitioned to entirely online, including our workshops. Our *Small Scale Sessions* have proven to be a great way to reinforce that GIS can be taught online and engaging (with the support and flexibility of the Library). In addition to instruction, software demands have also changed. Working collaboratively with the University's Information Technology department, we have established remote desktops for students, staff, and faculty to follow along with workshops, or need a workstation to do their research or class project. Software like Zoom and Box have also been immeasurable resources making virtual instruction possible.

In the fall quarter, we added the longer introductory workshops (e.g., QGIS, ArcGIS Pro, and ArcGIS Online) and saw similar growth in attendance. Moreover, we hosted two workshops advertised to the general public and not exclusively to Northwestern University affiliates. In response to current events, one workshop specifically focused on mapping social justice movements and had 93 registered participants. The subsequent workshop focused on open-sourced GIS software (e.g., QGIS) had 83 registrants. The increase in attendance and signups is evidence virtual instruction has potential, not just during the pandemic, but after as well. Pairing the introductory sessions with the short, focused sessions proves to be a new and successful model of instruction.

Next steps, areas for improvement

Some issues and concerns remain. When in-person instruction was available,



workshop attendees used distributed laptop computers, and the internet connection provided by the University was stable and fast. In the new and remote environment, concerns over hardware, software, and internet access exist. Recent conversations focused on digital inequality have highlighted the disparities faced by students who come from low-income communities or identify as people of color (Romm, 2020). For this reason, students with a lack of access to machines or stable Internet connections are at a disadvantage in attending our workshops. A possible solution to this concern is to record GIS workshops and then hosting the recordings on a server where students can view them asynchronously.

Mirroring the current environment, we want to continue to be flexible and adaptable as things change. We rotate the *Small Scale Session* topics and continuously revise offerings to consider topics based on need (e.g., intermediate and advanced skill), trend (e.g., COVID-19), or new technology (e.g., new and updated tools). Our GIS group is actively looking for opportunities to collaborate with different research groups, departments, and faculty teaching geographic concepts in their courses. As mentioned, we are also looking at opportunities to incorporate the physical map collection into online instruction. Adapting the ways we offer our GIS services during the pandemic, specifically stressing the importance of flexibility and adaptability seen in the *Small Scale Sessions*, will continue. This model has proven to be a successful model for the Geospatial and Data Services group in the Libraries at Northwestern.

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