DOI: 10.14714/CP102.1853

Quantity Over Quality? Teaching Cartography Through the 30 Day Map Challenge

Carl M. Sack
Fond du Lac Tribal and Community College
carl.sack@fdltcc.edu

I used the 30 Day Map Challenge as a framework to structure my Spring 2023 Cartography and Visualization community college course. Students were tasked with a new mapping assignment following the themes of the Map Challenge to complete during each class meeting throughout the semester, as an alternative to a more traditional project-based lab structure. I sequenced lecture topics to accompany and elucidate the Map Challenge prompts, and used Socratic prompts on Google Jamboard slides to spur collaborative class discussions. As a whole, the ten-student class completed 80% of submissions for 27 required mapping prompts, submitting a total of 218 maps that fulfilled the prompts. Short, thematic mapping activities entailed greater repetition of software workflows as well as more opportunities for independent problem solving.

INTRODUCTION: CARTOGRAPHY AT A COMMUNITY COLLEGE

How can an instructor in an undergraduate cartography course best engage their students, given the heavy cognitive load of such a course? Modern cartography is a discipline rooted in both technical skills and visual design chops, and thus requires an active learning curriculum that allows students hands-on experiences to build their mapping skills (Harvey and Kotting 2011). The standard curriculum model involves a mixture of lecture on the principles of map design and project-based lab assignments in which students apply those lecture concepts to constructing their own maps (Huffman 2018). This course structure requires a high level of student engagement, including many hours of work on lab projects outside of facilitated classroom lab hours.

The standard cartography course design works for highly motivated, upper-level undergraduate students. However, I have found it a challenge to implement in an open enrollment community college environment. Community college GIS offerings are typically two-year associate degree programs. The most advanced courses must therefore be taught at a sophomore level, whereas they are often junior or senior level courses in the university setting. Further, most community college students have off-campus work and/or family obligations that reduce their capacity for working on lab assignments outside of class time (Sockin 2021). It's worth noting that a substantial minority of four-year university students also face such challenges, and classes that require large amounts of project work outside of class time may inadvertently enroll and favor more advantaged students.

After five years of teaching a community college cartography course with low enrollment and mediocre success at fulfilling the intended learning outcomes, I decided that minor tweaks to the directions of multi-week lab assignments were inadequate improvements. I needed a radically new model. Fortunately, an alternative model of cartographic skill development existed and was being practiced by thousands of cartographers each year, albeit outside of formal education channels: The 30 Day Map Challenge.

THE MAP CHALLENGE

The 30 Day Map Challenge was created by Finnish cartographer Topi Tjukanov in 2019. It consists of a set of 30 themes of one to a few words each, one for each day in November (Figure 1). Participating involves making a map that fits the day's category and posting it to social media with the hashtag *#30DayMapChallenge*. Participation is thus entirely voluntary and free for anyone with a social media account. Some cartographers strive to complete daily maps for all prompts, while others may complete only part of the list. The Map Challenge has generated thousands of publicly shared maps, exposing cartographers worldwide to a rich array of new data sources and design ideas.

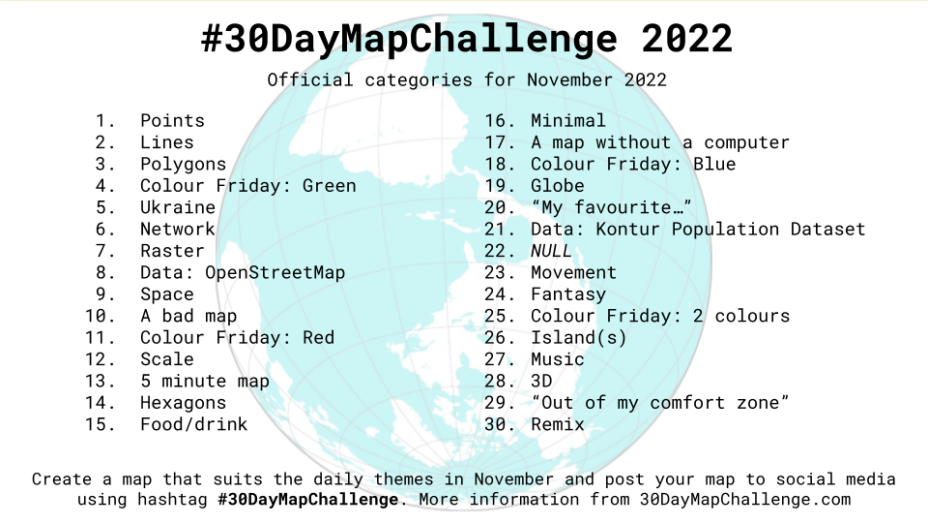


Figure 1. Daily themes of the 2022 edition of the 30 Day Map Challenge, from 30daymapchallenge.com (Topi Tjukanov).

To adapt the Map Challenge to my curriculum, I first examined how it could fit with the class schedule. I typically teach my cartography course in a block schedule, meeting for two hours and 40 minutes twice a week. In my institution's 16-week spring semester, this schedule works out to exactly 30 class meetings, including the final exam period. Thus, it was a simple matter to convert the 30 Day Map Challenge into a single mapping activity each class day, following the Challenge themes.

From a pedagogical perspective, trading a few multi-week lab assignments for daily mapping challenges invokes a concept best known as the "parable of the pottery class." The parable, as told by Bayles and Orland (1993), states that a ceramics instructor divided their class into two groups: in the first, students were graded based on the total weight of finished pots produced by the end of the term; in the second, they were graded based on the quality of a single final pot. The result was that the "quantity" group outperformed the "quality" group in the artistry of their final works. This ironic finding is attributed to the former students' lack of insecurity regarding experimentation and greater opportunity to learn from their mistakes. The parable is ostensibly based on a true story pertaining to a photography class, and is applicable regardless of the medium (Kleon 2020).

To adopt the lesson of the parable, rather than grade each individual map activity on quality, I simply counted each submission as complete or incomplete, depending on whether the student had turned in something that fulfilled the challenge prompt. I also gave narrative feedback on each map submitted. Each completed activity earned the student one activity point. At the end of the semester, I tallied all points to assign the activity grade for the course (worth 50% of the overall course grade). I initially considered 26 points equivalent to an "A," but later reduced this to 25 points, as I made one activity (Activity 22, "NULL") optional due to an illness-related class cancellation.

An obvious challenge of assigning daily mapping activities to an introductory cartography course with no prerequisites was the lack of students' prior technical knowledge of how to make a map. The 30 Day Map Challenge was intended mainly for professional cartographers. Beginners with no prior knowledge required guidance and scaffolding to complete each daily theme (Harvey and Kotting 2011).

A source of inspiration to address this challenge was *The Great British Baking Show* (or, as it's known outside of the United States, *The Great British Bake Off*). In this reality television series, participants are all amateur bakers, and are given three baking prompts, or "briefs," each episode, and a set amount of time to complete each brief. The second brief is always a Technical Challenge, in which

contestants are given a pared-down recipe and a set of ingredients, and must use their prior knowledge of baking principles to complete the challenge.

Like the *Baking Show*'s Technical Challenge recipes, I addressed the need for scaffolding around each daily Map Challenge theme with a corresponding activity prompt tailored to the skills and concepts that had been previously introduced during the course. For several of these prompts, I provided students with a sample dataset (the "ingredients" for the map), as taking the time to find and process data would have made the activity impossible to complete in the time allotted. In some cases, I gave students a set of explicit instructions for procuring data from an online repository, with the intention of teaching them how to access and process such datasets in the most efficient way possible (Figure 2).

In keeping with the *Baking Show* format, I assigned time limits to the mapping activities. These ranged from five minutes (for Activity 13, "5 minute map") to two-and-a-half hours, based on my best estimate of the complexity of the activity prompt. The time limit was intended to motivate completion during the class period, while I was available for immediate assistance. I also encouraged students to assist one another in class, as some students had already completed an introductory GIS course and were thus already familiar with the GIS software interface and key concepts, while others were delving into digital mapmaking for the first time. Unlike the *Baking Show*, I allowed students who did not complete the activity within the time limit to submit it late via email with no penalty, to avoid too much stress on students.

All but two activities required the production of a map. The exceptions were Activity 1, "Points," which was a group exercise in adding points to an existing web map, and Activity 10, "A bad map," which prompted students to critique an existing map. Activities 16, 20, and 30 prompted students to change or improve a map they had made during a previous activity. All other activities asked for a unique map submission. Activities 14, "Hexagons," and 30, "Remix," were incorporated into midterm and final exams, respectively.

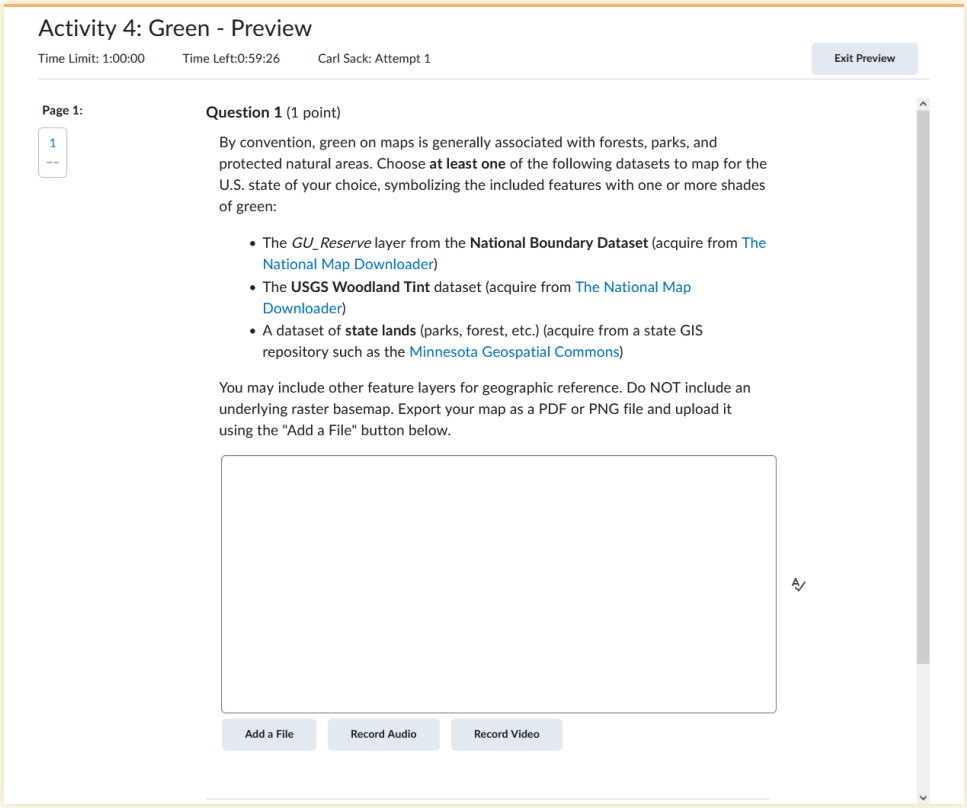


Figure 2. An example activity prompt provided through the course's learning management system.

LECTURES, DISCUSSIONS, AND DELIVERY FORMAT

As in previous, more traditionally structured iterations of the course, I imparted cartographic theory and concepts via classroom lectures. However, I reordered the lecture sequence away from prioritizing scaffolding of theoretical constructs toward delivering the content most useful for the next Map Challenge theme. I also sought to increase the amount of active learning in class by using Google Jamboard as a platform for collaborative class discussions (Harvey and Kotting 2011). Jamboard is a web app that simulates a flip chart, allowing anyone viewing it to add movable notes and sketches. Rather than having to raise their hands to contribute to the discussion verbally,

students can contribute written notes anonymously, making it easier for shy or tongue-tied students to participate and limiting the space taken up by more vocal students. I created a total of 31 Jamboard pages with Socratic questions meant to draw out students' understanding of, and stimulate critical thinking about, a mapping topic. I held a discussion on a set of topic slides either right before or right after a related activity or lecture (Paul and Elder 2007; Figure 3).

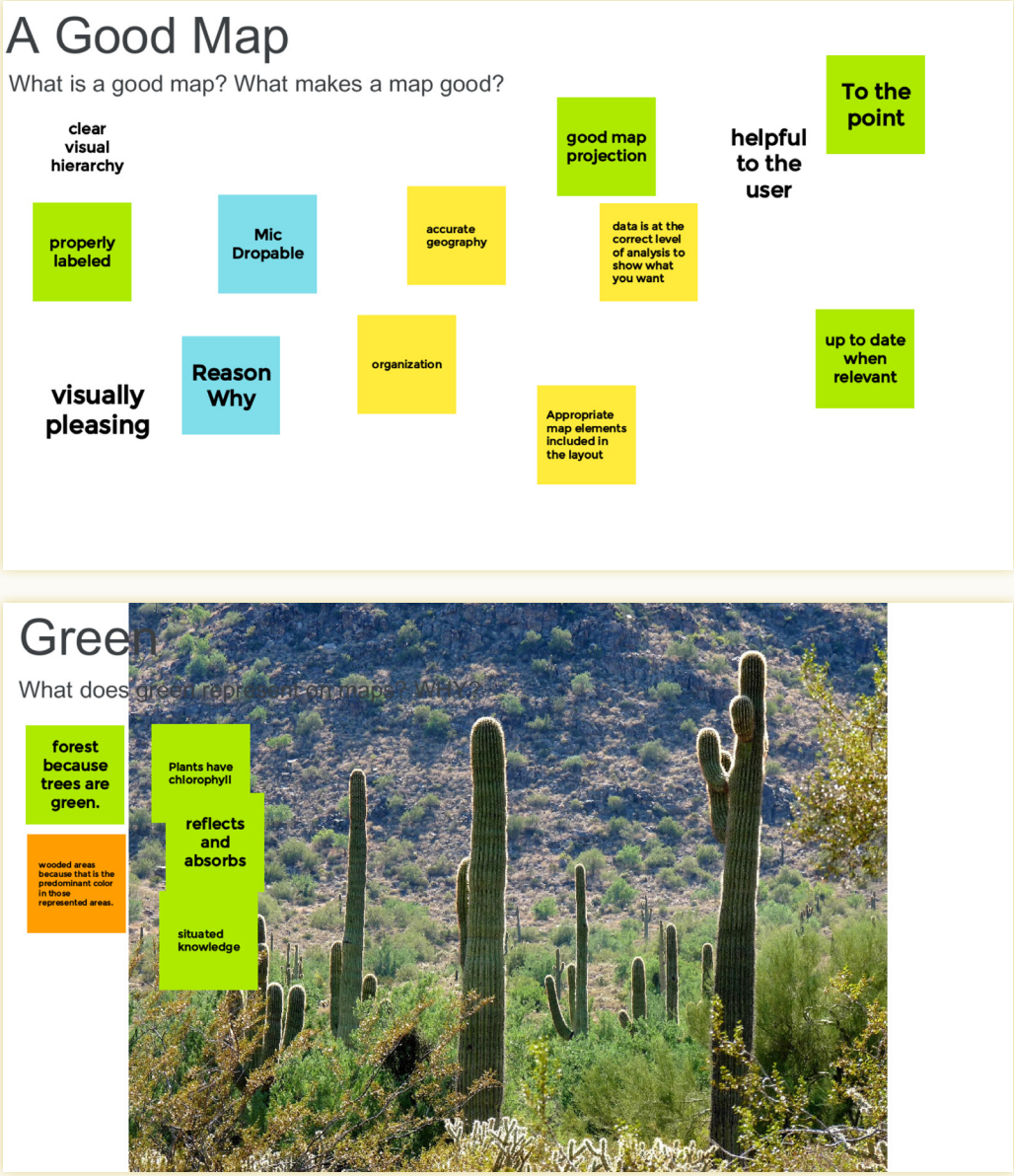


Figure 3: Examples of Jamboard slides with content generated by students during class discussions.

The course was delivered in a student choice hybrid format, whereby students could choose on a day-to-day basis whether to join the class in person or remotely via a videoconferencing connection. This allowed students who were ill, had transportation problems, or needed to care for family members to participate in classes they were unable to attend in person. The disadvantages of this delivery method were that remote students could not easily get help from their peers or unsolicited advice from me looking over their shoulder. All of the learning tools used in the course were either online tools (such as Jamboard and the course learning management system) or software that students could download to their home PCs or use on a borrowed school laptop.

PARTICIPATION AND PROGRESS

The revised course format resulted in satisfactory student participation. With ten students finishing the course, the Map Challenge activities resulted in 238 completed submissions, 218 of which were unique maps created by students, or an average of 22 maps per student. The lowest rate of completion for an individual student was 17 out of the 30 activity prompts (15 out of 28 maps). Four students completed the 25 or more activities required for an "A" activity grade. Only eight submissions, and no more than one for any activity, were considered "incomplete" because they did not fulfill the prompt. Later in the semester, as activity prompts increased in difficulty,

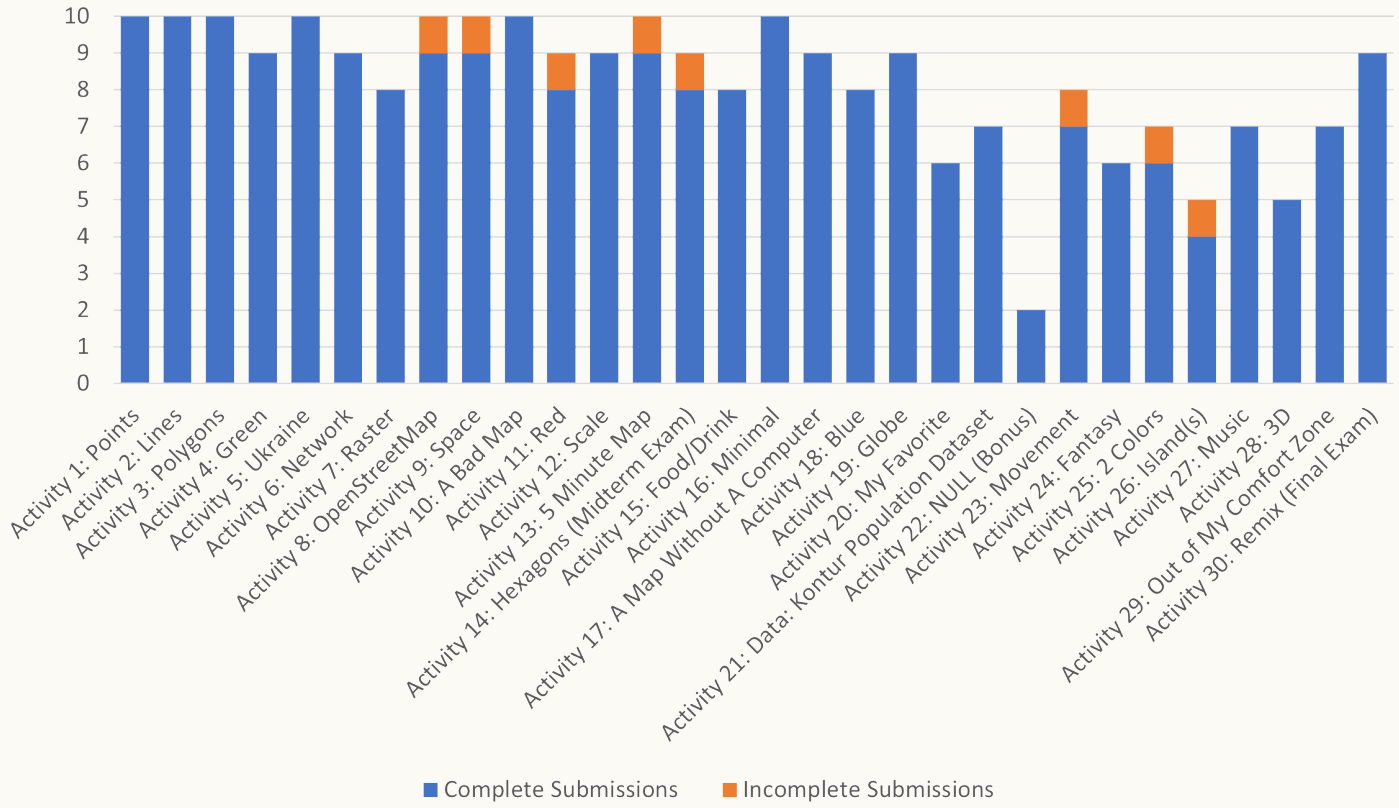


Figure 4. Completion rates for each Map Challenge activity

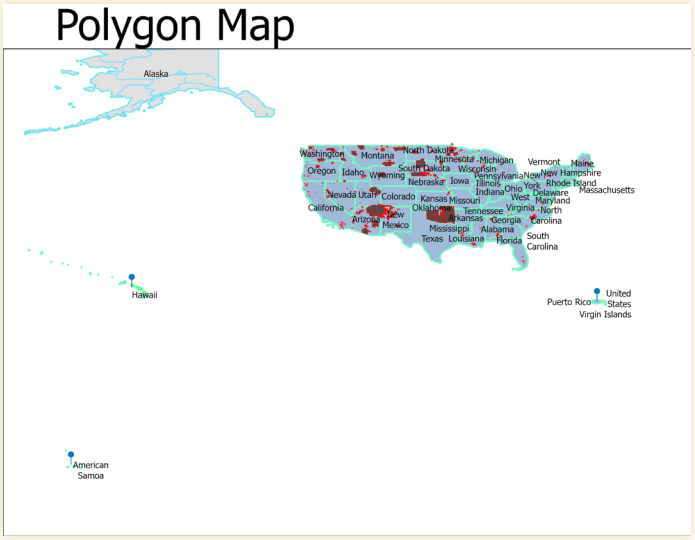
the activity completion rate fell. However, other than the bonus activity (Activity 22), only one activity had a completion rate below 50%, and two-thirds of the activities had a completion rate of 80% or better (Figure 4).

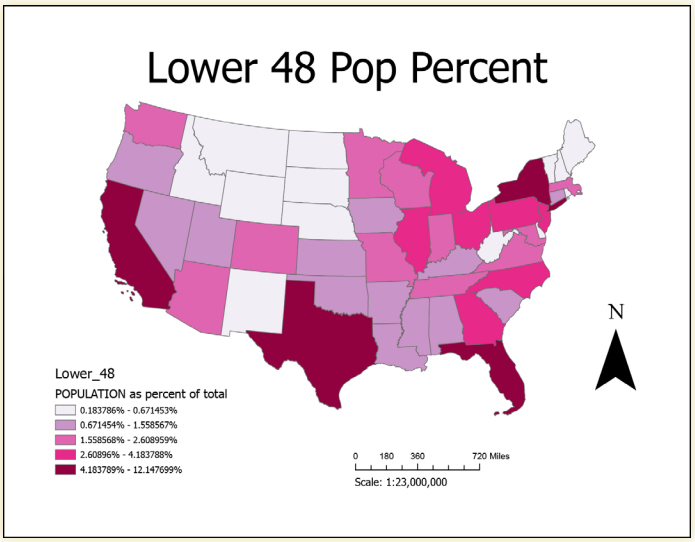
The maps that students submitted were not, of course, professional quality. Nonetheless, they showed the results of repetitive practice with mapping software tools and numerous opportunities for experimentation. The refined maps created for the final exam prompt (Activity 30, "Remix") were simpler than final project maps in previous iterations of the course, but comparable or better in overall design quality. They showed marked improvement from early submissions among both beginners and students with some prior GIS experience. Figure 5 compares examples of first and final digital maps from students with and without prior map-making experience.

Two bonus questions on the final exam surveyed students as to what skills and concepts were the most difficult for them to learn during the course, and what learning they expected to use in future work. The most common difficulty was figuring out Adobe Illustrator, with four out of the seven students who submitted responses mentioning it. Other difficult topics included data normalization, raster symbolization, file organization, and web map creation, each mentioned by one student. Two students each cited learning ArcGIS Pro and learning Adobe Illustrator, respectively, as the most useful course outcomes. Others felt they benefitted from learning map layout principles, symbolization, and thematic data visualization, and gaining confidence in their own ability to learn computer skills.

LESSONS LEARNED

Overall, integrating the 30 Day Map Challenge into my cartography course was a modest success. The use of smaller daily activity prompts increased repetition of map creation tasks in GIS software, such that by the





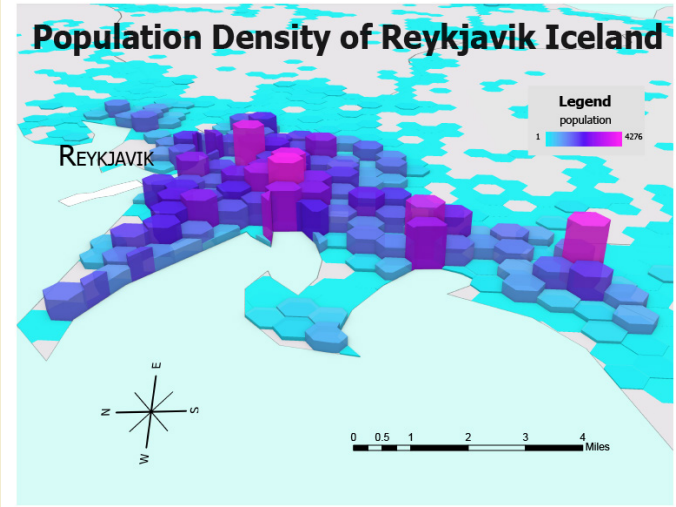


Figure 5. Comparing submissions from Activity 3 (left) and Activity 30 (right), from a student with no prior GIS experience (top) and a student who had taken an introductory GIS course (bottom).

end of the course, students were adept at the basic steps of adding data, changing the map projection, symbolizing features, and creating layouts. The structure of activity prompts—a single customizable end goal with few step-by-step instructions—allowed for independent problem-solving, creativity, and self-discovery.

Perhaps the most positive outcome was that students did not fall behind on lab assignments, necessitating due date delays and reducing the amount of time for new learning content. Since all activities were timed for completion in a single class period, late work was almost a non-issue. This led to more available class time for lecture and discussion, as no class time needed to be dedicated to allowing students to play catch-up on big mapping projects. As a result, I was able to introduce new topics that I had not been able to cover in previous iterations of the course, and I did not have to cut any content for time at the end of the semester. Since there was little activity-based homework, students could dedicate more out-of-class time to lecture review and studying for exams.

Nonetheless, exam scores did not significantly improve from prior iterations of the course, so it was unclear whether students better internalized cartographic design concepts covered in the lectures. Although the majority of students completed enough activities to earn an activity grade of A or B, three students received a D, indicating that they had not been able to complete several of the prompts despite the class time dedicated to them. The

drop in activity submissions during the final third of the course was concerning and may indicate a need to simplify or clarify some of those activity prompts.

Under the student choice hybrid delivery format, the number of students physically in the classroom varied each class period, averaging about 50% of the class on any given day. Despite conscientiously checking in with remote students, I was not able to easily monitor their progress and provide unsolicited advice the way I could with students in the classroom. It was often the remote students who were unable to finish their maps during the class period.

QUANTITY → QUALITY

Whether using the 30 Day Map Challenge improved learning outcomes in my community college cartography course is uncertain. In future iterations, more scaffolding may need to be provided for later prompts. An additional challenge may be the time involved in rewriting activity prompts and reordering lecture content to fit the new themes of the next 30 Day Map Challenge, which changes every year. However, the format encouraged on-time activity submissions, and thus opened up more class time for additional learning content and fruitful class discussions. The Map Challenge provided an engaging way for students to learn mapmaking through experimentation and problem-solving. The notable improvements between students' early map submissions and their later ones showed that in cartography, quantity can lead to quality.

REFERENCES

Bayles, David, and Ted Orland. 1993. *Art & Fear: Observations on the Perils (and Rewards) of Artmaking*. Santa Cruz, CA: Image Continuum Press.

Harvey, Francis, and Jennifer Kotting. 2011. "Teaching Mapping for Digital Natives: New Pedagogical Ideas for Undergraduate Cartography Education." *Cartography and Geographic Information Science* 38 (3): 269–277. **https://doi.org/10.1559/1523040638269**.

Huffman, Daniel P. 2018. "A Freelancer's Approach to Teaching Cartography." *Cartographic Perspectives* 90: 82–85. **https://doi.org/10.14714/CP90.1491**.

Kleon, Austin. 2020. "Quantity Leads to Quality (the Origin of a Parable)." *Austin Kleon* (blog). December 10, 2020. **https://austinkleon.com/2020/12/10/quantity-leads-to-quality-the-origin-of-a-parable/**.

Paul, Richard, and Linda Elder. 2007. "Critical Thinking: The Art of Socratic Questioning." *Journal of Developmental Education* 31 (1): 36–37.

Sockin, Jason. 2021. "College Employment and Student Performance." *Penn Wharton Budget Model* (blog). October 4, 2021. **https://budgetmodel.wharton.upenn.edu/issues/2021/10/4/college-employment-and-student-performance**.

Tjukanov, Topi. n.d. "About Me." *Topi Tjukanov* (personal website). Accessed July 16, 2023. **https://tjukanov.org/aboutme**.