Faculty Fellows Final Project Report 23-24

Sarah Schlosser
Project: OER Implementation and Student Collaborative Writing

Project Description: Last semester I wrote an Open Educational Resource (OER) textbook, [Making Effective Maps: Cartographic Visualization for GIS](), for the GIS Mapping course (GEOG 3053) that I teach every semester. The book has 12 chapters covering topics that line up with the course content. The textbook was still in draft format at the beginning of this semester, but the final version was published on Pressbooks in March.

For my Faculty Fellow project, I implemented a student collaborative writing project. I had students self-select groups in which they worked together to create a chapter or section introduction (200-250 words), review questions (10), include a supporting graphic/map, indicate citations for two supporting articles, and indicate if the students felt any topics were missing or needed to be added to the textbook. For longer chapters the assignment was split between two groups, so students were responsible for reviewing a similar portion of the textbook. Groups consisted of 5-7 students, which were primarily self-selected; students who did not self-select a group were randomly placed in a topic group. While the groups worked collaboratively to develop the materials, I often found that one student took the lead in managing and organizing the tasks while portions of the assignment were split between participants.

The due dates were spread over the semester and corresponded to when the topic was covered in the lecture. The assignment was graded using a rubric (attached) that showed the allocation of the total points (25) over the tasks and how points would be awarded for each task (performance measures). As part of each student's grade for the overall project (10 of 35 total points), they took at least 5 surveys. The surveys were used to determine which review questions would be included in the textbook. Students selected the five questions, out of 10, that they thought were most relevant and helpful when studying that topic of the chapter/section. Once the survey results were tallied, the five questions that received the most votes were published on Canvas as a review document prior to any substantive assessments. The questions will be put into the textbook later this month for universal use (pending legal approval). The entire assignment, collaborative writing and survey participation, made up approximately 10% of each student's grade.

The goal of allowing students to select a topic they were interested in was aimed at increasing student choice in a class that is often quite rigid. Furthermore, it was imperative that students work collaboratively, allowing a variety of voices to be heard in order to reduce textbook bias, helping students realize the value of the learning and the writing process. By having students participate in the creation of these materials along with taking

the surveys about the chapter review questions, they developed skills in collaborative writing, evaluation of learning materials for usefulness, learned to navigate library search engines (assisted by a guest librarian in-class presentation), and critically assess journal articles for relevance to the subject matter.

While I could not assess the individual gains of the students, I evaluated understanding of the topics within each group as a small sample of the class, but this varied significantly between groups. I had also expected to see wider evidence of project success from higher quiz scores, but compared to the previous two semesters the quiz grades were about 3.5 percentage points on average lower for the three subject matter quizzes. However, I cannot contribute that solely to this project or the use of the OER textbook. I made some substantial changes to the quiz questions and added a section on ethics in mapping, both which could have adversely affected grades. I also noted that class attendance and participation on lecture days was quite low this semester.

I utilized a Canvas survey (attached) to determine student perception of this project and using an OER textbook. The survey was worth five extra credit points. The survey included questions about the group dynamics, the learning process, and any issues that arose within the group. A question was included about self-selecting a group and its impact on their motivation to complete the project. Finally, two questions were asked about the OER textbook related to student motivation. Of the 86 students enrolled in the class, 79 students completed the survey.

The three survey questions most directly related to this project are as follows:

- Did the project promote learning between you and your fellow students?
    - 66% responded positively, 22% unsure
- Did the project help you gain a better understanding of the material?
    - 75% responded positively, 18% unsure
- Did the project help you prepare for the quiz that contained the topic of your writing assignment?
    - 65% responded positively, 16% unsure

Based on those responses, I consider the project a success since the majority of students responded positively to those three questions and it helped 75% of respondents gain a better understanding of the material.

For groups that consented to having their materials published, the introductions and questions will be edited and then incorporated into the textbook and appropriately cited. In doing that I will create a digital archive of the student work that other students and faculty can utilize as an example for creating similar works. The OER project itself meets

university goals by reducing student textbook costs, increasing student success by removing student motivations to illegally obtain content or complete courses without required textbooks, and provide access to the material at the beginning of the course. By recruiting student groups to write and be published in the OER textbook, the project meets university and department goals to provide more equitable education experiences and collaborative learning experiences, helping to reduce material bias.

This project impacted student learning, including content development which is the highest level of learning based on Bloom's taxonomy. Students were positively impacted by this project according to the survey results and it gave them some control over the materials and how they are presented to other students.

In the Geography Department we have challenges related to the success of our students, particularly first-generation and non-white students. While this is not something specific to my department, the difficulty and technical side of many of our classes provides further challenges to the success of many students. By allowing students to contribute to the learning process and using study questions derived by students, they had more ownership of the materials, and will help future courses to be more successful. The Geography Department is also working on different methods to address grade disparities and remove explicit and implicit bias in the curriculum/course materials, which this project falls in line with.

Lessons Learned:
- A student's desire to be published varies widely and even some of the best students are not interested in having their work published.
- I should have pursued legal advice before initiating the project therefore it would have been easier to obtain student permission to publish their group work. I have reached out for legal advice and must wait for guidance before moving forward with publishing the student work for any groups in which a member indicated they don't want their work published.
- For students not wanting their work published I should have offered them an alternative assignment that way it would not have delayed/prevented the publication of the remaining group members' work.
- Providing students with very clear guidelines with an accompanying rubric helped to provide consistency between groups.
- Groups of 5-7 may have been too large for all students in each group to gain a good understanding of the materials via the assignment. I think such a project would have been better with a smaller class that would have allowed groups of 2-4 students.

Faculty Fellow Program Reflection: It was great to learn about various instructional methods and how best they can be integrated into the classroom through both readings and training sessions. More impactful though, was hearing from and discussing with other faculty members what they were using in their classrooms that has been successful. Lots of "tips and tricks" were shared, including simple and easily implemented changes that could help with issues such as attendance and class participation. While I instituted the use of OER resources to replace a costly textbook and implemented a collaborative writing project for one class this semester, participating in the Faculty Fellow Program encouraged me to make changes to my other courses and participate in additional CTL programs.

One of the Faculty Fellows training sessions was about ungrading and included a reading that outlined how to implement it via rubric examples. I have since drafted both a syllabus and rubrics for my GEOG 4503/5503 GIS Project Management class. The class typically has no more than 20 students and is project-based so it is a great place to apply ungrading. I was also connected with another faculty member that has utilized ungrading, and I met with her to review what I had drafted to get suggestions for anything I might be missing, or adjustments needed to my rubrics/syllabus statements.

Furthermore, since I was redeveloping all three of my courses, it was suggested that I connect with the pilot program of Students with Partners. I participated in the program this semester, working with an undergraduate student to adjust course topics, homework assignments, in-class activities, and readings for GEOG 2053 Mapping a Changing World, making the course more relevant to students and the skills needed in the workforce.

Overall, I found the program extremely beneficial, and the timing of my participation well aligned with my reduced teaching semester when I was able to revamp the courses I teach regularly. I would highly recommend the program to anyone looking to make positive adjustments to their course structure and looking to make connections with other faculty throughout campus.

**Artifacts Attached**: Student Project Rubic, OER Project Feedback Survey and Statistics, Student Work Examples

ARTIFACTS

Quiz Summary

(https://canvas.colorado.edu/files/75177685/download?download_frd=1&verifier=B0C1KSFqxDWVLHQXz9IvqrkAwQkps0utE0wY648q)

Average Score	High Score	Low Score	Standard Deviation	Average Time
100%	100%	100%	0	

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%
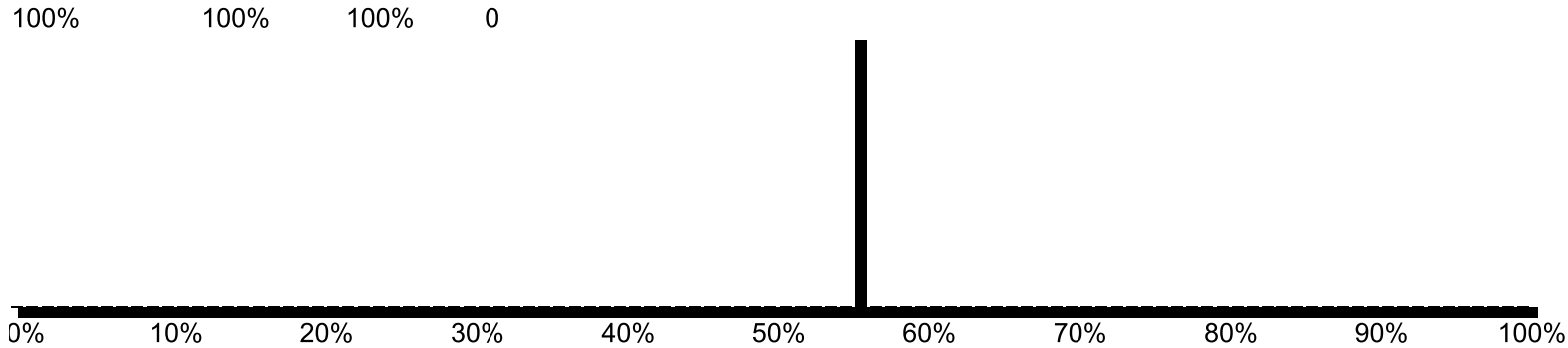
Question Breakdown

ttempts: 79 out of 79

id your group work well together (e.g., communication, division of labor, etc.)?

rue	66 respondents	84 % ✓	84% answered correctly
alse	13 respondents	16 %	

ttempts: 79 out of 79

your group did not work well together, what went wrong? If your group worked fairly well together, please select N/A.

poor communication	14 respondents	18 % ✓	6% answered correctly
nequal contributions (Loafing/Overachieving)	6 respondents	8 %	
ersonal issues (e.g., conflicting personalities)		0 %	
lacked focus	2 respondents	3 %	

last minute completion/missed deadline	[10 respondents](#)	13 %
scheduling conflicts	[4 respondents](#)	5 %
something else	[1 respondent](#)	1 %
N/A	[61 respondents](#)	77 %

ttempts: 79 out of 79

id the project help you gain a better understanding of the material?

True [59 respondents](#) 75 % ✓   75% answered correctly

False [6 respondents](#) 8 %

nsure [14 respondents](#) 18 %

ttempts: 79 out of 79

id being allowed to self-select your group/topic (if you chose a group) help motivate you and/or increase your desire to participate? Select N/A if you were randomly aced in a group.

Yes [47 respondents](#) 59 % ✓   59% answered correctly

No [8 respondents](#) 10 %

nsure [10 respondents](#) 13 %

N/A [14 respondents](#) 18 %

ttempts: 79 out of 79

o you think the project helped your prep for the quiz that contained the topic of your writing assignment?

yes [51 respondents](#) 65 % ✓   65% answered correctly

no [15 respondents](#) 19 %

nsure [13 respondents](#) 16 %

ttempts: 79 out of 79

id the project promote learning between you and your fellow students?

yes [52 respondents](#) 66 % ✓   66% answered correctly

no [10 respondents](#) 13 %

nsure 17 respondents 22 %

ttempts: 79 out of 79

re you more likely to use/read a textbook if it is free?

rue 75 respondents 95 % ✓   95% answered correctly

alse 4 respondents 5 %

ttempts: 79 out of 79

id the fact that you did not have to purchase a textbook influence your decision to take this course?

yes   9 respondents 11 % ✓   11% answered correctly

no, made no difference 12 respondents 15 %

o, but I appreciated that 58 respondents 73 %

ttempts: 79 out of 79

re you willing to have your group's work published and your name attached to it in the online version of the OER textbook (link below)? Respond YES if that is cceptable to you. Respond NO if you prefer to remain anonymous. Respond DECLINE if you do not want your work published at all.

ote: All works are subject to editing before being published.

laking Effective Maps (https://colorado.pressbooks.pub/makingmaps/)

Yes 70 respondents 89 % ✓   89% answered correctly

No 7 respondents 9 %

ecline 2 respondents 3 %

Generated: 2:38pm

Report can not be generated for Survey Quizzes.

Criteria	Ratings					Pts
Written Introduction Submission clearly addresses the topics of the chapter/section and what the reader can expect to understand/gain from the reading.	**11 pts** **Full Marks** Addresses all of the topics and what the reader expects to gain.	**9 pts** **Needs Minimal Improvement** Missing a few topics, but overall covers the topics well	**6 pts** **Needs Improvement** Missing more than 3 topics and/or lacks discussion on what the reader expects to gain.	**3 pts** **Needs Significant Improvement** Missing many topics and did not address what the reader expects to gain.	**0 pts** **No Marks** No submission or does not meet any of the assignment requirements (e.g., off-topic)	11 pts
Word Count Submission is 200-250 words in length not including any citations/bibliography.	**3 pts** **Full Marks** At appropriate length.	**2 pts** **Needs Minimal Improvement** 25-49 words over or under	**1 pts** **Needs Improvement** 50-99 words over or under	**0 pts** **No Marks** 100+ words over or under		3 pts
Grammar and Spelling No grammar or spelling errors in the introduction.	**1 pts** **Full Marks** no errors	**0.5 pts** **Needs Improvement** Minimal errors (less than 5)	**0 pts** **No Marks** Significant errors (5 or more)			1 pts
Citations If resources are used, they must be cited in-text and included in a bibliography. This includes if AI is used.	**1 pts** **Full Marks** citations included (if required)	**0.5 pts** **Needs Improvement** missing a few citations (2 or more)	**0 pts** **No Marks** no citations provided though required			1 pts

Criteria	Ratings					Pts
Resources Two other resources related to the topic are included. Acceptable resources are peer-reviewed journal articles, chapters from books (not OER), and government or academic webpages (e.g., an article published on CU Boulder's website, **census.gov** ⤷ **(http://census.gov)**). Links to the resources or PDFs are included/attached.	**2.5 pts** **Full Marks** resources are of the type indicated and related to the topic; links or attachments are provided.	**1.5 pts** **Needs Improvement** missing one resource or are not of the required type or did not include a link/attachment	**0.5 pts** **Needs Significant Improvement** neither resource is of the type indicated and/or links attachments not provided for either resource; OR resources are not related to the topics	**0 pts** **No Marks** no resources provided		2.5 pts
Map Include a related map and attach it as a jpeg, jpg, or png. The map can be an example of a well-executed map or one that does not follow good design techniques related to the topic of the chapter/section selected. Source of the image must be indicated.	**1 pts** **Full Marks** topic-related map included; source indicated	**0.5 pts** **Needs Improvement** map provided, but missing source information.	**0 pts** **No Marks** no map provided or unrelated to the chapter/section topics			1 pts
Questions Include 10 questions related to the materials like those you would see at the end of a textbook chapter. No true/false, fill-in-the-blank, or multiple-choice questions will be accepted. Matching (for terms) is acceptable.	**5 pts** **Full Marks** 10 questions provided, are related to the topics and are of acceptable form.	**3 pts** **Needs Improvement** Missing 1-2 questions, up to 2 questions are not directly related to the topics, or up to 2 questions are not of the accepted format. If multiple criteria are not met a lower score will be received.	**2 pts** **Needs Significant Improvement** Missing 3-4 questions, 3-4 questions are not directly related to the topics, or 3-4 questions are not of the accepted format. If multiple criteria are not met a lower score will be received.	**1 pts** **No Marks** Missing more than 4 questions, more than 4 questions are not directly related to the topics, and/or more than 4 questions are not of the accepted format or a combination.	**0 pts** **No Marks**	5 pts

Criteria	Ratings					Pts
Missing Topics Indicate if there are topics or concepts that were missed or need further discussion.	0.5 pts **Full Marks** indicated what topics were missing or in need of further discussion OR indicated that all topics were covered sufficiently			0 pts **No Marks** nothing indicated either way		0.5 pts
					Total Points: 25	

Student Work Examples

Chapter 3, Part 1 - Drake Austro-Stasyshyn, Taylor Bata, Ayden Heinrich, Hunter Koontz, Michael Vanner, Zoe Piro

Cartographic design is not as simple as putting features on a map. There is artistry behind every cartographic decision and this chapter introduces a framework by which you can create beautiful and effective maps. The cartographic design process entails five crucial steps. First, determine the meaning of the map and consider what aspects need to be articulated to the intended audience (who define the purpose). Second, determine the appropriate map scale so that the map distance to the ground distance is apparent to the audience and usable for the map purpose. Scale also influences the extent of detail that can be shown on any particular map so should be chosen carefully. Third, the map-maker has to determine the category of the map they intend to create (reference, thematic, or pragmatic), what data they require, the source of that data, and whether or not the format is adequately suited to the information being portrayed. The format will inform other decisions such as how it will be accessed -physically or digitally- and the costs associated with creation. Fourth, abstraction and generalization allow the map to depict features aligned with the map's purpose and hierarchy. This is commonly done by selecting key datasets, using data classification, and simplifying features through symbology or data processing. Adaptive thinking is key in map layout, and several versions of the map will be created via continuous feedback throughout each step to create a map that fulfills its intended purpose and is aesthetically pleasing to its viewers. Finally, map creation demands critical thought and creativity to achieve a map that visually communicates the map's content and purpose so must be seriously considered throughout the design process.

Questions

1. How do the principles of hierarchy and balance in map design contribute to the effectiveness of a map in conveying complex geographical data?
2. How does the selection and simplification of geographic features influence the map's purpose and the user's interpretation?
3. How does the integration of interactive elements in digital cartography, such as zoom functions and clickable layers, enhance or challenge traditional cartographic principles of hierarchy and balance in map design?
4. Describe how the choice of geometry and visual variables in symbolization can alter the perception and effectiveness of a map.
5. When considering map accessibility for visually impaired readers, how can visual variables be utilized to assist in legibility?

Chapter 4 - Lilly Curry, Jack Hiatt, Fang Hoo, Lindsey Peacock, Sami Peoples

Understanding the differences between data types is crucial, especially when creating a visually appealing map that accurately portrays the data. The levels of measurement can be categorized as quantitative and qualitative data. These levels can be further distinguished as nominal, ordinal, interval, or ratio, each exhibiting different characteristics. By distinguishing between these data types, this chapter provides practical guidance on using visual variables to create meaningful and informative maps relative to the data type. Visual variables include size, shape, orientation, texture, color hue, and color value, and are used to differentiate data symbols on a map. By applying visual variables effectively, the mapmaker can meaningfully relay the map data in a way that can be easily understood by the reader.

This chapter will introduce you to:
● Differences between qualitative and quantitative data types
● Difference between nominal, ordinal, interval, and ratio data types
● Different visual variables
● How to apply visual variables based on data type

By the end of this chapter, you should understand the difference between the levels of measurement and how they relate to visual variables. Furthermore, you should be able to apply the visual variables for effective representation of various types of data on maps while maintaining readability and aesthetic appeal.

Questions
1) What is visual hierarchy?
2) Which visual variables are used for each type of data - nominal, ordinal, ratio, interval?
3) What is the difference between qualitative data and quantitative data?
4) Why is hue useful for qualitative data?
5) What are the primary differences between ratio and interval data?

Chapter 5 - Alex Walker, Alma Daly, Ethan Covington, Jacey Lane, and Will White

Thematic symbols are indispensable tools for representing spatial data, offering insights through various techniques for the different vector data representations - points, lines, and areas. Dot density maps employ randomly placed dots within specific enumerations, making them particularly adept at illustrating the density of phenomena. In contrast, in proportional and graduated symbols the size of the symbols correlates with the underlying data, which is useful when the data range surpasses the suitability of dot density maps. They can show data at a specific point (a town's population) or data over an area (water usage in a county). Line and area symbols display naturally discontinuous features, such as a road. Much like point symbols, there are many opportunities to display patterns in spatial data by modifying size or other visual variables for line and area symbols. By the end of this chapter, you should be able to determine which of the thematic symbols are most appropriate for the three types of vector features - point, line, and areas - along with being familiar with alternative techniques such as isolines and cartograms.

Questions
1) What is the purpose of Flannery scaling for proportional symbols? When should it be used?
2) What is the difference between graduated and proportional symbols? Which is better at representing relative magnitude?
3) When should graduated symbols be used instead of proportional symbols?
4) How does an isopleth map differ from a basic choropleth map?
5) What is a cartogram?

Chapter 9 - John Davis, Grady Forsyth, Kevin Frame, Beckett Gonzales, Emily Leahy, Kieran Stone, and one anonymous student

It is easy to think of the Earth as a perfect sphere, however, to create accurate maps, we must consider how the spherical Earth is converted to a flat map, the components needed to do so, and how projections affect the feature representation. This chapter introduces the projection components that produce two-dimensional maps from three-dimensional surfaces and the basics of the Earth's coordinate systems.

Topics covered include:

- Geodesy - the Earth's shape and the relative approximations for defining the shape
- Datums - how datums are used with map projections, common datums used, and datum transformation
- Coordinate Systems - this section explains geographic and projected coordinate systems

By the end of this chapter, you should understand the basic shapes of the Earth, how datums are used with coordinate systems, and how different coordinate systems impact location representation.

Questions

1) If using an Ellipsoid to depict areas of North America, would the same Ellipsoid be able to approximate areas in say Europe? If not explain why.
2) The Universal Transverse Mercator (UTM) Coordinate System is split into how many zones?
3) While looking at a State Plane Coordinate System, how is error reduced in locating specific areas within a large state such as California or Texas?
4) Why is it important to understand the location of the point or line(s) of tangency on a map in terms of distortion?
5) What is geodesy?
6) How is a datum related to a coordinate system?