DATA VISUALIZATION FOR EDUCATIONAL DATA SCIENCE

EDLD 652
WINTER 2023

Course Information

Course Title	: Data Visualization for Educational Data Science
Course Number	: EDLD 652
CRN Number	: 21675
Credits	: 3
Date/Time	: Monday, 1:00 pm – 3:50 pm
Place	: 115 Lokey Education Building (Click for map)
Instructor	: Dr. Cengiz Zopluoglu (Click for pronunciation)
E-mail	: cengiz@uoregon.edu
Office Hours	: Monday 4:00 pm – 5:00 pm (HEDCO 359 and Zoom)

Zoom Link for office hours on Mondays:

https://uoregon.zoom.us/j/6883665008?pwd=S1BkMTZhTk4weWZVSjUvQ2FVeGowQT09

Meeting ID: 688 366 5008

Password: 768421

Course Modality

This course is an in-person course: which means that, unlike asynchronous online/ASYNC WEB courses, we will meet during scheduled class meeting times in Lokey 115. I will accommodate absences as described in the Absence policy. UO encourages you to consider ASYNC WEB courses if you need additional flexibility. If you need accommodation related to disability, you can request those by working with the Accessible Education Center (https://aec.uoregon.edu).

Course Description and Objectives

EDLD 652 is the second course in the Educational Data Science Specialization taught at the University of Oregon through the College of Education. This course will be taught through R, a free and open-source statistical computing environment. It will provide students with the foundational principles and practice of data visualization, mainly applied to scientific and technical data. We will have weekly lectures covering a wide variety of topics, including human perception, color theory, and principles of visual design. We will also cover mediums for communication across diverse audiences with an emphasis on web deployment. Hands-on laboratory sessions provide students the opportunity to put the lecture material into practice.

Learning Outcomes

By the end of this course, students should be able to:
- Transform data in a variety of ways to create effective data visualizations
- Create and customize graphics in a variety of ways using best practices (e.g., color choices, text annotations, categorical axis ordering)
- Build web-based platforms for sharing data visualizations

Course Prerequisites

Enrolling in this course requires successful completion of the first course in EDS specialization (EDLD 651). Students who waived the first course are assumed to have the knowledge and skilled as covered and taught in EDLD 651. The course material for EDLD 651 is accessible at this link: https://uo-datasci-specialization.github.io/c1-intro-fall-2022/schedule.html

Textbook

All course readings are freely available online or will be provided by the instructor. We will have chapters from each of the following books:

- Happy git with R, Jenny Bryan
- R for Data Science, Hadley Wickham Garrett Grolemund
- Data Visualization: A Practical Introduction, Kieran Healy
- Fundamentals of Data Visualization, Claus O. Wilke
- Other content not in the course books

Each of the above links to the entire book. These are excellent resources that I highly suggest you dive into, particularly if you have difficulty with a particular topic. The "other" listed above will include additional readings for topics not covered by the books (e.g., Matthew Kay's excellent keynote presentation on uncertainty visualization at the 2018 Tapestry conference). The readings will be posted for each week on Canvas.

Course Website

Canvas is an essential part of our course and the place to go for course information and engagement outside class time. Log into canvas.uoregon.edu using your DuckID to access our class. If you have questions about accessing and using Canvas, visit the Canvas support page. Canvas and Technology Support also is available by phone or live chat:

541-346-4357 | livehelp.uoregon.edu

Course Structure

The course will consist of in-person lectures, recommended readings, lab activities, and a final project.

In-person lectures

The lectures and the course content are primarily provided in class during the scheduled time and location. You are encouraged to overview the course material, complete supplemental readings before the class, and bring your questions to have a more active discussion about the content. The lecture material and course content will be posted on Thursday or Friday (as early as possible) for next week's class. You are encouraged to take full advantage of office hours for any questions regarding the course content and work on assignments.

Readings

All course readings are freely available online or will be provided by the instructor. The links to recommended readings will be posted on CANVAS for each week.

Lab Assignments

There are four labs during the course, which must be submitted within one week of being assigned. Labs will include designated in-class time (if possible), but any work not completed during class must be completed on your own. Labs will be scored on a "best honest effort" basis, which generally implies zero or full credit. Many of the labs require completion of specific portions before moving on to the next sections. If you find yourself stuck and unable to proceed, please contact the instructor for help rather than submitting incomplete work. Contacting the instructor is part of the "best honest effort." If the assignment is not complete, and the student has not contacted the instructor for help and obtained approval for submitting incomplete work, only partial credit will be awarded. Partially completed labs that have been discussed with the instructor may receive partial credit. Assignments will be posted as .Rmd files. Each student must turn in the completed lab work electronically on Canvas as a Word or Pdf file (after knitting your .Rmd file) with your last name as the beginning of the file name. If you are hosting your work online as a GitHub repo, you can also post the link to the GitHub repo.

Data visualizations "in the wild" presentation

On the first day of the class, you will be randomly assigned a date to share data visualizations you have found in publications or websites or anywhere else IRL (in real life). This is not a formal presentation. You share the links to the data visualizations with me, and I will project them. There will be a discussion post on Canvas dedicated to each week. When it is your turn, you must post your reflection and discussion here before the class. You will then present your discussion about what you like/dislike about the plot you chose. We will then have a brief discussion as a class. Note that this project is aimed at identifying a range of data visualizations. It would be ideal if both good and poor data visualizations were presented from various sources.

Final Project

The final project includes multiple components, culminating in a data visualization portfolio. A detailed final project description will be posted on Canvas in the first week of class.

Grading

The grades will be combined using a weighted average grading scheme with the corresponding weights given below:

- o   4 Lab assignments   40 % (10 % each)
- o   5-min Data Visualization "in the wild" presentation   5%
- o   Final Project   55%
    - ▪   Proposal (5%)
    - ▪   Draft (5%)
    - ▪   Peer Review (10%)
    - ▪   Presentation (5%)
    - ▪   Product (30%)

Grades will be assigned based on the percent of the total possible points accumulated on lab assignments and extra-credit reading assignments. Final letter grades will be assigned according to the following scheme:

A+	97% - 100%	B	83% - 86.9%	C-	70% - 72.9%
A	93% - 96.9%	B-	80% - 82.9%	D+	67% - 69.9%
A-	90% - 92.9%	C+	77% - 79.9%	D	63% - 66.9%
B+	87% - 89.9%	C	73% - 76.9%	D-	60% - 62.9%
		F	< 59.9%		

Please note that if this class is taken P/NP, 80% or higher is required

Incompletes for this course will be offered rarely and in unusual circumstances preventing students from completing the course work during the regular course schedule. Incompletes will not be awarded simply because the student has not finished coursework on time. Incompletes will only be awarded when a documented medical or similar unforeseen emergency prevents coursework completion.

If you need any additional time for any reason, please send an email and request an extension. Late assignments without notice to the instructor will be penalized such that 20% of total points are deducted for each day it is late.

Office Hours

Office hours are held after class on Mondays from 4 pm to 5 pm. You can either come to my office if you would like to meet in person or join online using the Zoom link below.

https://uoregon.zoom.us/j/6883665008?pwd=S1BkMTZhTk4weWZVSjUvQ2FVeGowQT09

Meeting ID: 688 366 5008

Password: 768421

Communication

Our class will communicate through our Canvas site. Announcements and emails are archived there and automatically forwarded to your UO email, and can even reach you by text. Check and adjust your settings under Account > Notifications. I do so through Canvas messages when I need to contact individual students. If you have a question about course content, assignment, reading, or other class components, or if you have something to share, please create a new discussion post on the Discussion section, which I respond to daily, and where your peers can also pose questions and share answers. If your question is about a technical challenge with Canvas, Zoom, or another technology, please

contact the [UO Service Portal.](#) If your question, concern, or excitement is about something personal, is time sensitive, or is something else that doesn't feel like it fits above, please do reach out to me by email or by attending office hours! If you contact me with a question, I will try to respond within one business day. 4

Absences

This is a face-to-face course. While there is no automatic grade reduction for missing classes, attendance is essential because we will develop our knowledge through in-class lectures and discussions. We know our UO community will still be navigating COVID-19, and some students need to isolate and rest if they get COVID. Please take absences only when necessary, so when they are necessary, your prior attendance will have positioned you for success. Students with COVID are encouraged to seek guidance and resources at [UO's COVID-19 Safety Resources webpage.](#)

If students need to be absent from a class due to a COVID-related quarantine or illness, I will provide a link for the recordings of the lectures. Students are encouraged to watch these recordings and do their study of class material. Students should contact the instructor for any questions related to the material from lectures they miss.

Course Schedule

Week	Date	Topic	Assignments Posted	Assignments Due	Readings
1	1/9	Course Overview Working with String data Introduction to Visualizations	Final Project		
2	1/16	NO CLASS – Martin Luther King, Jr. Day			Ch. 2 & 4, Healey Ch. 14 & 28, Wickham & Grolemund Ch. 5 & 6, Wilke Ch. 1, Silge & Robinson
3	1/23	Visual Perception	Lab 1		Ch. 1, Healey Ch. 2, Wilke
4	1/30	Color	Lab 2	Lab 1 Proposal	Ch. 4 & 19, Wilke
5	2/6	Communication	Lab 3	Lab 2	Ch. 8, Healey Ch. 16 & 20 & 23 & 29, Wilke
6	2/13	Uncertainty	Lab 4	Lab 3	Ch. 5, Healey gt Tables
7	2/20	Websites, flex dashboards, fonts, and some CSS customization		Lab 4 Draft	Rstudio Distill Bookdown - Websites
8	2/27	Tables Introduction to Geographic data			Ch. 7, Healey Ch. 15, Wilke
9	3/6	TBD		Peer Review	
10	3/13	Presentations		Presentation	
	3/20	Final Product is due			

* The column indicates the dates the homework assignments will be posted.

Course Policies and Other Information

Indigenous Recognition Statement

The University of Oregon is located on Kalapuya Ilihi, the traditional indigenous homeland of the Kalapuya people. Today, descendants are citizens of the Confederated Tribes of the Grand Ronde Community of Oregon and the Confederated Tribes of the Siletz Indians of Oregon, and they continue to make important contributions in their communities, at UO, and across the land we now refer to as Oregon.

Student Engagement Inventory

Educational Activity	Hours student engaged	Explanatory Comments
Course Attendance	28.5	10 meetings, at 170 minutes per meeting
Assigned Readings	28.5	Weekly readings
Lab Assignments	20	4 assignments
Projects	43	Proposal (2hrs), Draft (30 hrs), Peer Review (6 hrs), Finalization (5 hrs)
Total Hours	120	

Diversity, Equity and Inclusion

It is the policy of the University of Oregon to support and value equity and diversity and to provide inclusive learning environments for all students. To do so requires that we:

- respect the dignity and essential worth of all individuals.
- promote a culture of respect throughout the University community.
- respect the privacy, property, and freedom of others.
- reject bigotry, discrimination, violence, or intimidation of any kind.
- practice personal and academic integrity and expect it from others.
- promote the diversity of opinions, ideas and backgrounds which is the lifeblood of the university.

In this course, class discussions, projects/activities and assignments will challenge students to think critically about and be sensitive to the influence, and intersections, of race, ethnicity, nationality, documentation, language, religion, gender, socioeconomic background, physical and cognitive ability, sexual orientation, and other cultural identities and experiences. Students will be encouraged to develop or expand their respect and understanding of such differences. Maintaining an inclusive classroom environment where all students feel able to talk about their cultural identities and experiences, ideas, beliefs, and values will not only be my responsibility, but the responsibility of each class member as well. Behavior that disregards or diminishes another student will not be permitted for any reason. This means that no racist, ableist, transphobic, xenophobic, chauvinistic or otherwise derogatory comments will be allowed. It also means that students must pay attention and listen respectfully to each other's comments.

Using Pronouns and Personal Preference

The College of Education is always working to include and engage everyone. One way we can do this is to share your pronouns, or the words you want to be called when people aren't using your name. Like names, pronouns are an important part of how we identify that deserves to be respected. And we recognize that assuming someone's gender can be hurtful, especially to members of our community who are transgender, genderqueer, or non-binary. As a community, we are all learning together about the importance of pronouns and being better allies to the trans community on campus. Please discuss the pronouns you wish to be used with your professor to help them be aware of how to address you respectfully. Please visit this university website for more information.

https://studentlife.uoregon.edu/pronouns

Accessible Education - (see https://aec.uoregon.edu/best-practices-faculty for more information) The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. Participation includes access to lectures, web-based information, in-class activities, and exams. The Accessible Education Center (*http://aec.uoregon.edu/*) works with students to provide an instructor notification letter that outlines accommodations and adjustments to class design that will enable better access. Contact the Accessible Education Center *in 360 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu* for assistance with access or disability-related questions or concerns.

Accommodation for Religious Observances

The university makes reasonable accommodations, upon request, for students who are unable to attend a class for religious obligations or observance reasons, in accordance with the university discrimination policy which says "Any student who, because of religious beliefs, is unable to attend classes on a particular day shall be excused from attendance requirements and from any examination or other assignment on that day. The student shall make up the examination or other assignment missed because of the absence." To request accommodations for this course for religious observance, visit the Office of the Registrar's website (https://registrar.uoregon.edu/calendars/religious-observances) and complete and submit to the instructor the "Student Religious Accommodation Request" form prior to the end of the second week of the term.

Mental Health and Wellness

Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you're facing such challenges, you don't need to handle them on your own--there's help and support on campus.

As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about.

University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at health.uoregon.edu/ducknest.

University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All clinical services are free and confidential. Find out more at counseling.uoregon.edu or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number)."

Basic Needs

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course is urged to contact the Dean of Students Office (346-3216, 164 Oregon Hall) for support. This UO webpage includes resources for food, housing, healthcare, childcare, transportation, technology, finances, and legal support: https://blogs.uoregon.edu/basicneeds/food/ If your need is urgent, please contact the Care and Advocacy Program by calling 541-346-3216, filling out the Community Care and Support form, or by scheduling an appointment with an advocate.

Respect for Diversity

You can expect to be treated with respect in this course. Both students and your instructor(s) enter with many identities, backgrounds, and beliefs. Students of all racial identities, ethnicities, and genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientation, citizenship statuses, ability and other visible and non-visible differences belong in and contribute to this class and this discipline. All students are expected to contribute to a respectful, welcoming and inclusive environment for every member of the class.

Class rosters are provided to instructors with students' legal names. Please let me know if the name or pronouns I have for you are not accurate. It is important to me to address you properly.

Please let me know if aspects of the instruction, course design, or class activities undermine these principles in any way. You may also notify the (Home Department) at (contact information). For additional assistance and resources, you may also consider contacting the Division of Equity and Inclusion through their website or by phone (at 541-346-3175), or the Center for Multicultural Academic Excellence through their website or by phone (at 541-346-3479).

Academic Integrity

The University Student Conduct Code (available at *conduct.uoregon.edu*) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources

of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at *https://researchguides.uoregon.edu/citing-plagiarism*."

Mandatory Reporter Status

I am an Assisting Employee under the University's Prohibited Discrimination and Retaliation Policy. As an Assisting Employee, I will direct students who disclose prohibited discrimination and harassment, including sexual harassment or violence, to resources that can help and will only report the information shared to the university administration if the student requests that the information be reported (unless someone is in imminent risk of serious harm or a minor).

Students who have experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, students may also call either the non-confidential Title IX Coordinator/OICRC at 541-346-3123 or the Dean of Students Office 24-hour hotline at 541-346-SAFE [7244]. Students experiencing all forms of prohibited discrimination or harassment may find information and resources at investigations.uoregon.edu or contact the non-confidential Title IX Coordinator/OICRC at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. Specific details about confidentiality of information and reporting obligations of employees can be found at investigations.uoregon.edu/employee-responsibilities.

I am also a mandatory reporter of child abuse. UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. This statement is to advise you that your disclosure of information about child abuse to a UO employee may trigger the UO employee's duty to report that information to the designated authorities. Please refer to the following link for detailed information about mandatory reporting: Mandatory Reporting of Child Abuse and Neglect.

Academic Disruption due to Campus Emergency

In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements

and/or access alternative assignments. Students are also encouraged to continue the readings and other assignments as outlined in this syllabus or subsequent syllabi.

Inclement Weather

It is generally expected that class will meet unless the University is officially closed for inclement weather. If it becomes necessary to cancel class while the University remains open, this will be announced on Canvas and by email. Updates on inclement weather and closure are also communicated in other ways described here: https://hr.uoregon.edu/about-hr/campus-notifications/inclement-weather/inclement-weather-immediate-updates"

Conflict Resolution

Several options, both informal and formal, are available to resolve conflicts for students who believe they have been subjected to or have witnessed bias, unfairness, or other improper treatment.

It is important to exhaust the administrative remedies available to you including discussing the conflict with the specific individual, contacting the Department Head, or within the College of Education, fall term you can contact the Associate Dean for Academic Affairs, Sylvia Thompson, (541) 346-2483 sthomps5@uoregon.edu. Outside the College, you can contact:

- UO Bias Response Team: 346-3216 http://bias.uoregon.edu/whatbrt.htm
- Conflict Resolution Services 346-3216 http://studentlife.uoregon.edu/support
- Affirmative Action and Equal Opportunity: 346-3123 http://aaeo.uoregon.edu/

Grievance Policy

A student or group of students of the College of Education may appeal decisions or actions pertaining to admissions, programs, evaluation of performance and program retention and completion. Students who decide to file a grievance should follow University student grievance procedures (https://policies.uoregon.edu/grievance-procedures) and/or consult with the College Associate Dean for Academic Affairs (Sylvia Thompson, (541) 346-2483 sthomps5@uoregon.edu).

Course Incomplete Policy

Students are expected to be familiar with university policy regarding grades of "incomplete" and the timeline for completion. For details on the policy and procedures regarding incompletes,

Please see: https://education.uoregon.edu/academics/incompletes-courses

Reporting Title IX Experiences

Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, a student can also call either the UO's 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university.

Students experiencing any other form of prohibited discrimination or harassment can find information at https://respect.uoregon.edu/ or https://aaeo.uoregon.edu/ or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at http://aaeo.uoregon.edu/content/discrimination-harassment

Specific details about confidentiality of information and reporting obligations of employees can be found at https://titleix.uoregon.edu.