

CSC 362 Data Visualization
Spring 2024 Final Project:
Davidson College Class of 2021 - 2023 Career Outcomes
Davin Lim and Tyler Yandt
(Dr. Katy Williams)
May 3rd, 2024

1. Dataset

We manually scraped data from the [Career Center's website](#). Since there was no data presented or publicly available for the class of 2020 (presumably due to Covid), we decided to only include data that pertains to the past three consecutive graduating classes: class of [2021](#), [2022](#), and [2023](#). Unfortunately, when we reached out to the Career Center, they told us that they are currently still collecting and processing data for the class of 2024 (the most recent graduating class). In addition, the Career Center's comprehensive dataset on student career outcomes was not organized nor indexed by the class year for each unique student response. Thus, we decided that their dataset was not compatible for creating the visualizations that we wanted to. Therefore, we decided to work with what we have at our disposal.

The data set containing each student, their major, graduation year, Davidson defined sector, and status of employment variables was manually collected from the [Career Center's website](#). On this page, the data was found under a table titled "Detailed Employment/Education by Major." To collect all data for each major for the comprehensive list of years, we filtered the table by each individual major, and then reloaded the page for the separate years. The items of this dataset are the graduated students from Davidson College that responded to their survey. The attributes are as follows:

- Major - a categorical variable that falls under one of the majors that Davidson offers.
- Industry - this is a Davidson defined term. This variable is also categorical, and the term defines the industry that each student is either working in, or continuing their education in. One example of this variable is "Banking, Finance, Real Estate and Insurance."
- Organization/Institution - this is the company that the survey respondent is working at, or the institution that they are pursuing a further education in. This is a categorical variable.
- Job Title/Program - the title of the survey respondent's job, or the title of their program. This is a categorical variable.
- Employment Status - The table on the Career Center's website had two sections of students, one was listed was "Employed" and the other "Continuing Education."

Therefore, we manually pulled all of the students in the respective majors into our data set, and inputted, for each student, what their status is. This is a categorical variable, with a cardinality of 2.

- Class year - this indicates the year in which the survey respondent graduated. This is a quantitative variable.

N15										
	A	B	C	D	E	F	G	H	I	
1	Major	Sector/Industry	Organization/Ins	Job Title/Prograr	Employment Sta	Class Year				
2	Computer Scien	Consulting, Man	McDonald's	Software Engine	Employed	2023				
3	Computer Scien	Education, Socia	Alpha EDU	Academic Guide	Employed	2023				
4	Computer Scien	Consulting, Man	Huron Consultin	Digital Consultar	Employed	2023				
5	Computer Scien	Banking, Financi	CapitalOne	Product Develop	Employed	2023				
6	Computer Scien	Science, Techno	Microsoft	Software Engine	Employed	2023				
7	Computer Scien	Science, Techno	SAS	Associate Solutio	Employed	2023				
8	Computer Scien	Consulting, Man	Alphasights	Client Service As	Employed	2023				
9	Computer Scien	Science, Techno	Precisely	Associate Softwa	Employed	2023				
10	Computer Scien	Science, Techno	Microsoft	Software Engine	Employed	2023				
11	Computer Scien	Science, Techno	Precisely	Associate Softwa	Employed	2023				
12	Computer Scien	Education, Socia	Georgetown Uni	Front End Develo	Employed	2023				
13	Computer Scien	Consulting, Man	Bain & Company	Associate Consu	Employed	2023				
14	Computer Scien	Science, Techno	University of Nor	Computer Scien	Continuing Educ	2023				
15	Computer Scien	Science, Techno	Syracuse Univer	Applied Data Sci	Continuing Educ	2023				
16	Computer Scien	Science, Techno	Colorado School	Computer Scien	Continuing Educ	2023				
17	Africana Studies	Healthcare, Med	Thrive Skilled Pe	Care Experience	Employed	2023				
18	Africana Studies		Davidson Impact	Fellow	Employed	2023				
19	Anthropology	Consulting, Man	University of Not	Business	Continuing Educ	2023				
20	Anthropology	Education, Socia	Vanderbilt Unive	Anthropology Ph	Continuing Educ	2023				
21	Art	Arts, Entertainm	Live Nation	Talent Team Inte	Employed	2023				
22	Art	Education, Socia	Paramount Scho	Certified Teache	Employed	2023				
23	Biology	Healthcare, Med	National Institute	Postbacclaureate	Employed	2023				
24	Biology	Healthcare, Med	National Institute	Postbacclaureate	Employed	2023				
25	Biology	Healthcare, Med	Compleat Rehab	Physical Therap	Employed	2023				
26	Biology	Healthcare, Med	Weill Cornell Me	Research Techni	Employed	2023				
27	Biology	Education, Socia	Colorado State U	Research Assoc	Employed	2023				
28	Biology	Banking, Financi	Wells Fargo	Investment Bank	Employed	2023				
29	Biology	Healthcare, Med	Foot and Ankle /	Medical Assista	Employed	2023				
30	Biology	Healthcare, Med	Atrium Health	Clinical Researc	Employed	2023				
31	Biology	Healthcare, Med	Brigham and Wo	Clinical Researc	Employed	2023				
32	Biology	Healthcare, Med	International Spii	Patient Care Cox	Employed	2023				
33	Biology	Education, Socia	Salem Academy	Math Teacher	Employed	2023				

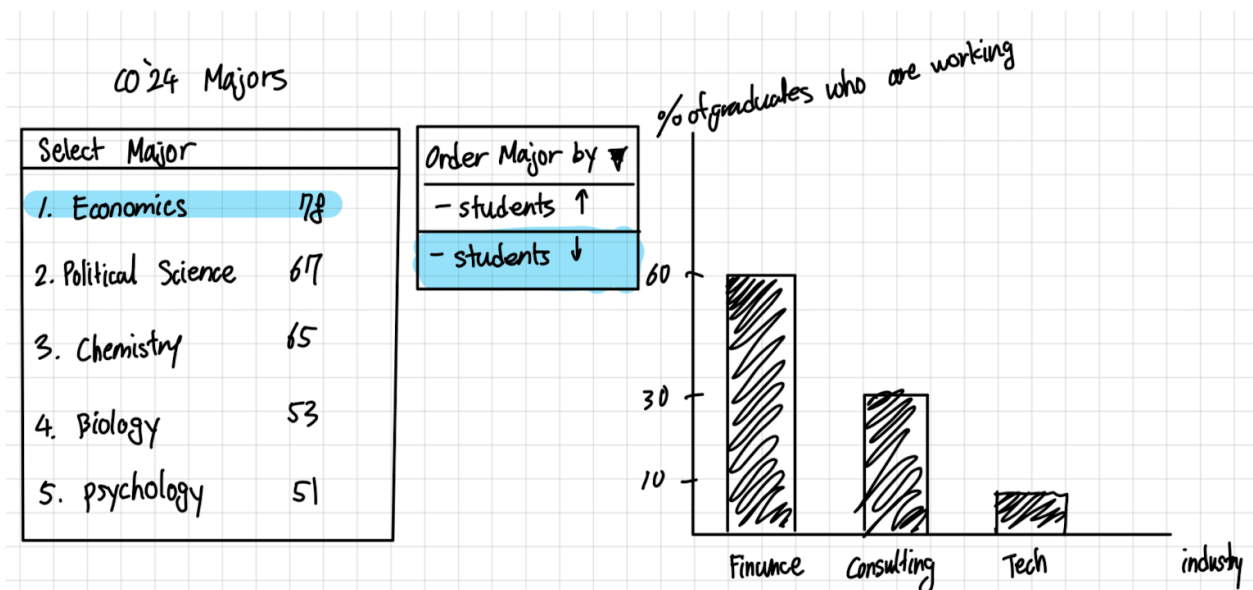
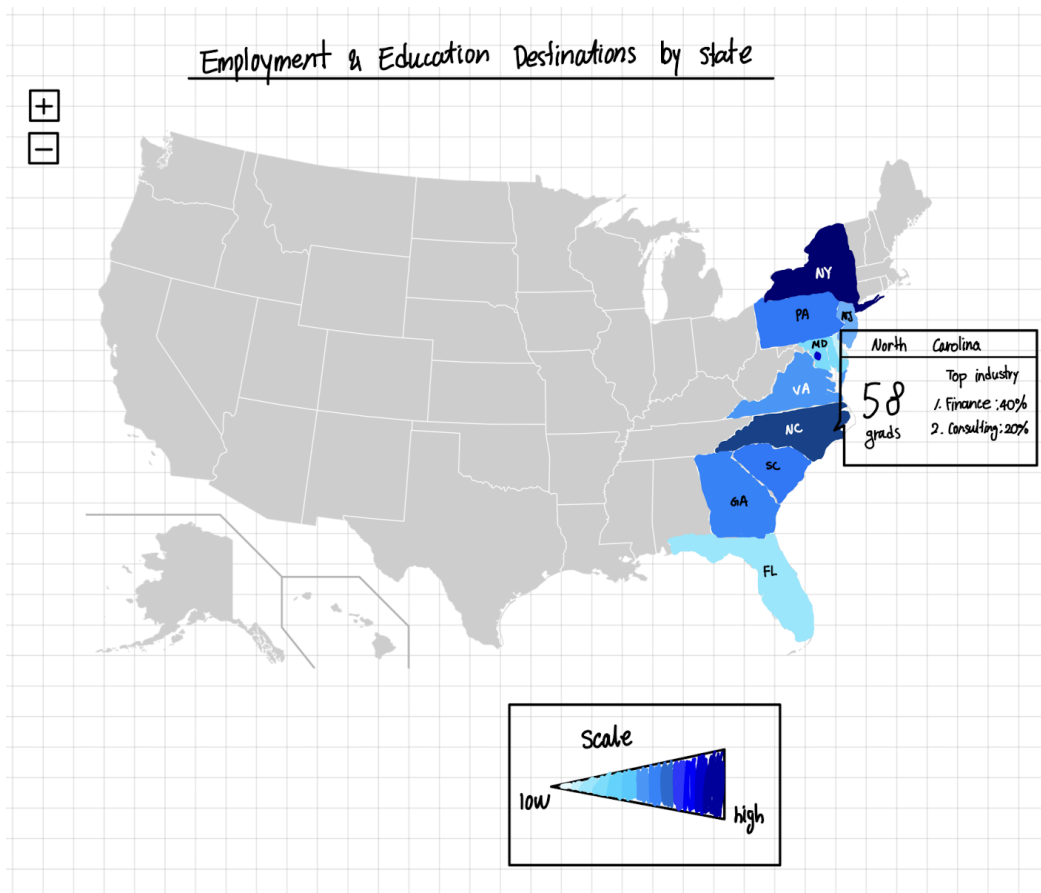
The second data set containing the number of students in each state post-graduation was scraped from the Career Center's website under the section "Where Are They? Employment & Education Destinations." When we scraped data for the US map that shows employment and education destinations by state, we had to manually add in "0"s for states to which no graduating students were moving post-graduation. Since their values initially appeared as Null (or blank), we thought it was reasonable to replace empty cells with "0"s since the empty cell implies that the given state had zero graduating students moving there after graduation. We also converted the state abbreviations into their actual names for better readability and compatibility with the us-states.json file that we used to create the map visualization. The items of the dataset are each

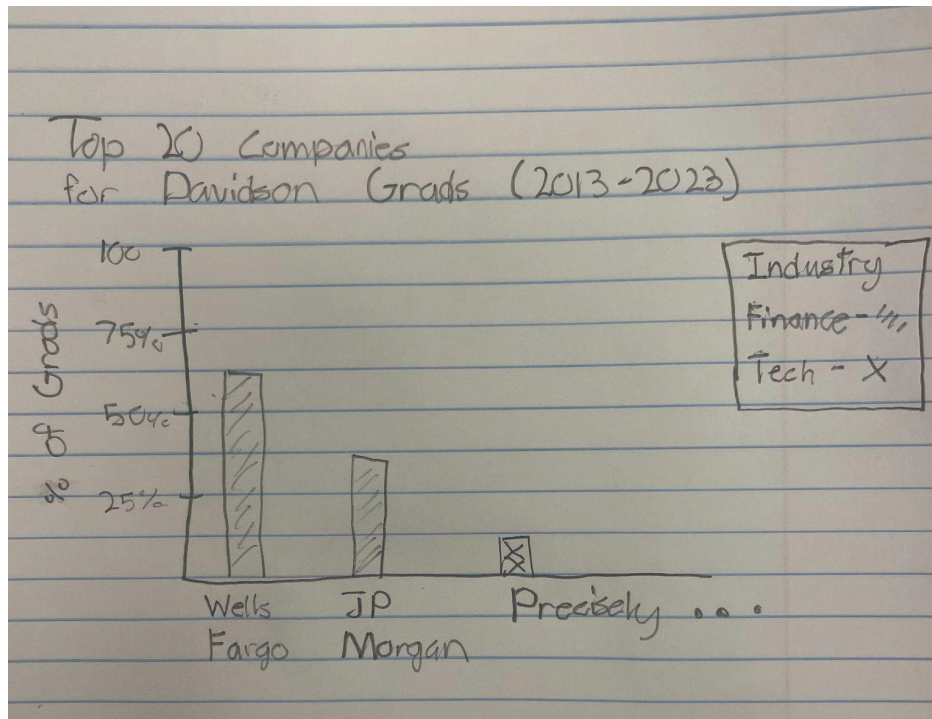
US state (representing the rows in the spreadsheet). The attributes for each item are the following:

- Year (categorical) : 2021, 2022, 2023, or Total (aggregation of all three years)
- Number of students (quantitative): number of students that will be moving to that state after graduation (value in the spreadsheet)

K7									
	A	B	C	D	E	F	G	H	
1	state	total	2023	2022	2021				
2	Alabama	2	1	1	0				
3	Alaska	0	0	0	0				
4	Arizona	0	0	0	0				
5	Arkansas	1	1	0	0				
6	California	16	4	6	6				
7	Colorado	8	4	2	2				
8	Connecticut	5	2	1	2				
9	Delaware	1	0	0	1				
10	District of Columbia	48	15	16	17				
11	Florida	13	4	4	5				
12	Georgia	37	13	7	17				
13	Hawaii	1	0	0	1				
14	Idaho	1	0	0	1				
15	Illinois	19	7	7	5				
16	Indiana	7	3	2	2				
17	Iowa	0	0	0	0				
18	Kansas	0	0	0	0				
19	Kentucky	2	0	0	2				
20	Louisiana	1	0	0	1				
21	Maine	0	0	0	0				
22	Maryland	22	2	9	11				
23	Massachusetts	45	16	12	17				
24	Michigan	6	0	2	4				
25	Minnesota	5	1	1	3				
26	Mississippi	0	0	0	0				
27	Missouri	5	1	2	2				
28	Montana	0	0	0	0				
29	Nebraska	0	0	0	0				
30	Nevada	0	0	0	0				

2. Paper Prototypes





Inspired by the scrollytelling visualization from Lab 8, we decided to visualize our data in a different way compared to our original prototypes. Instead of using majors as filters, we decided to make a separate visualization that shows the top 5 majors at Davidson amongst the students who responded to the survey. We also adopted the visualization framework for the scrollytelling vis from the lab. We thought it would be really cool to implement that with our data.

For the map with employment and education destinations, we weren't able to display the top industries for each state because we didn't have that information available to us. Thus, we resorted to only displaying the name of the state and the number of students moving to that particular state when the user hovers over. We also decided to get rid of the zoom in and out button since the map is big enough in the svg to be viewed in one big window. We also thought zooming in and out of the map defeats the whole purpose of the map because we want the user to be able to quickly view and register which states have the highest number of students. Zooming in and out will make it harder for the user to quickly determine the range (from the task analysis) of the highest number of students to the lowest number of students at a particular state.

3. Task Analysis

Your task analysis contextualizes the three tasks (**compare values, range, order**) for your dataset. The analysis also explains how the user could complete the task, **using mark and channel terminology**. You clearly explain how a blind or low-vision user could accomplish these same three tasks using non-visual means within the web browser. Your explanation considers how information may be lost and proposes possible solutions that may or may not be feasible with your given resources.

Three tasks to complete for task analysis

1. Given the number students that responded to the survey, compare the number of students that are continuing their education with the number of students who are employed at the time of responding to the survey. Are there more students employed, or more students continuing their education?
2. Given the map with all 50 US states (and DC), what is the range of the state with the highest number of students post-grad to the state with the lowest number of students post-grad in the year 2023?
3. Given the top ten companies that Davidson graduates have been employed at after graduation, can you rank them in descending order of the number of students employed?

Description of each task analysis question:

1. To **compare** the number of students that are continuing their education after graduating Davidson College with the number of graduate survey respondents that are employed, the user scrolls through the visualization to see the number of highlighted survey respondents at the respective steps. The number of each respective group is listed to the right. The user compares these two numbers, while also seeing the number represented by the highlighted boxes to the left; using the prose to the right, the user will be able to see that the number of respondents continuing their education is 185, and the number of respondents that are employed is 416.

2. To determine the **range** of the state with the highest number of students to the lowest number of students post-undergrad for the class of 2023, the user first selects the year 2023 button. Then the user hovers over the state with the darkest luminance of blue and then hovers over any state that has zero students (lowest luminance of blue). Doing quick math in their head, the user concludes that the range is from 0 students to 58 students for the
3. To **order** the top ten companies that survey respondents will be working for (at the time of they filled out the survey), the user looks at the length of each bar in the bar chart. The number of students working at each company is also listed to the side of the bar. Furthermore, the bars are already ordered by the number of students for convenience. This bar chart is the fourth step of the “scrolly-telling” section, and therefore the user will find this information there.

4. Accessibility Analysis

For each task, we will elaborate on how they can be completed with non-visual means. The majority of this will be done through a screen reader. Therefore the user will need to have a screen reader readily available to test these tasks.

1. To **compare** the number of students that are continuing their education after graduating Davidson College with the number of graduate survey respondents that are employed, the user must use a screen reader. If our understanding of a screen reader is accurate, then this task will be easy to complete; in the scrollytelling visualization, the exact numbers of students who are employed versus the number of students who are continuing their education are listed in the prose. Therefore, if the user scrolls through the visualization, these numbers will be read to them, and they can therefore determine which group has more students.
2. To determine the **range** of the state with the highest number of students to the lowest number of students post-undergrad for the class of 2023, the user will have to listen to the screen reader to gather information about the filtering buttons. We will include an explanation on the page about what the buttons are made for, therefore the user can understand our intentions. Further, once the correct year is selected, the user will use the

tool tip, in combination with a screen-reader, to find the state with the most students employed, along with the state with the lowest number of students to calculate the range of the data set.

3. To **order** the top ten companies that survey respondents will be working for (at the time of they filled out the survey), the user will scroll to find the bar graph encapsulating the number of students working at each company. We assigned labels to each bar; each bar is labeled with its respective company, along with the number of students working at each. Therefore, the user will be able to use the screen reader to determine the order of the top 10 companies in descending order.

5. Piloting Results

Script

Speaker: "We are evaluating our visualization and are asking you, the participant, to complete some tasks using the visualization and then provide feedback about the visualization and experience. As a reminder, we are evaluating the visualization, not you as a participant, so you don't need to worry about being "right" as you complete these tasks. There are three tasks, followed by a brief feedback session. The whole pilot session should take under 5 minutes. Do you consent to participate?"

[Wait for yes]

Speaker: "Thank you for agreeing to participate. We will start with the three tasks. Please 'think aloud' as you complete the task, meaning voice what you are thinking as you work through the task. Your first task is: Given the number students that responded to the survey for career outcomes, compare the number of students that are continuing their education after graduation with the number of students who are employed after graduation at the time

of responding to the survey. Are there more students employed, or more students continuing their education?"

[Pause to allow the participant to complete the task]

Speaker: "That is the end of the first task. Moving onto the next one, your second task is: Given the US map with all 50 states and DC, what is the range of the state with the highest number of students after graduation to the state with the lowest number of students after graduation for the class of 2023? ."

[Pause to allow the participant to complete the task]

Speaker: "That is the end of the second task. Now you have to complete one final task. Your final task is: Given the top ten companies that Davidson graduates have been employed at after graduation, please rank the top ten companies in *descending* order of the number of students employed."

[Pause to allow the participant to complete the task]

Speaker: "That is the end of the final task. For this last bit, we welcome any feedback you may have about the visualization or about your process for completing the tasks."

[Allow participant to speak first, then informal discussion]

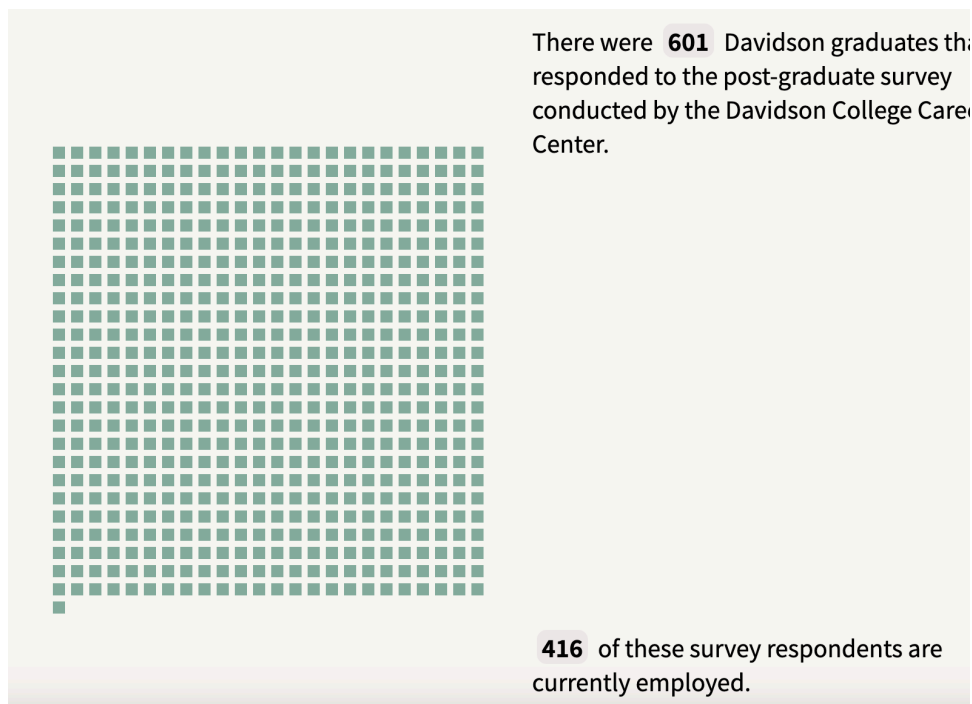
Speaker: "Thank you very much for participating in our piloting experiment. We appreciate you taking the time to complete the tasks and providing valuable feedback for our visualizations."

Pilot Participant

- Name: Ben Williams
- Class Year: Senior
- Major: Psychology
- Minor: Public Health

First task:

1. The participant noted that a student can be employed but also continuing the education if they defer their enrollment and work during their gap year
2. The participant answered the task question based off of the first two pieces of prose alone, not using the designated visualizations.
3. The participant said that “If you look at the text below, there are 416 students that are currently employed, and if you do the math real quick, then there should be about 190 something students continuing their education. That means that there are more students that are being employed than going to grad school after graduation.”
4. The participant successfully completed the task without using the scrolling functionality (the participant did not scroll to the part of the visualization where the students become highlighted).



Second task:

1. The participant first observed the entire map visualization.
2. Then the participant hovered over the year 2023 button and clicked on it to filter the data for the year 2023.

3. The participant noted that “North Carolina (NC) definitely has the highest number of graduates working after college or going to grad school because of its proximity to Davidson.”
4. The participant hovered over North Carolina (NC) and noted that “North Carolina has 58. Check.”
5. The participant proceeded to hover over other states on the East coast and said “Yeah, it seems like North Carolina has the most amount of students, so now I just need to find the state with the lowest number of students.”
6. The participant then hovered over the entire map to confirm that multiple states have zero students moving after graduation.
7. The participant did the quick math after determining the max and min value from the map: “North Carolina has 55 and there are states with zero, so the range should be 58 minus 0, which is 58.”
8. The participant successfully completed the second task.

Third task:

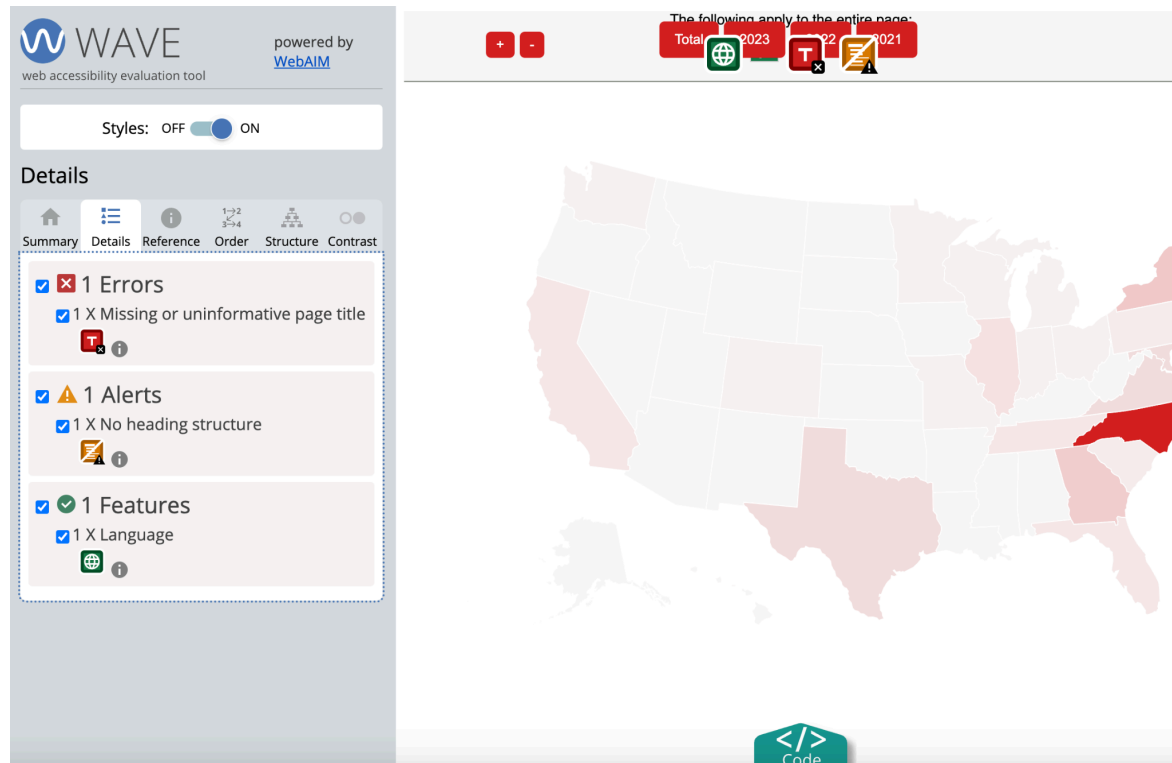
1. The participant scrolled down to the section that shows the top 10 companies (or employers) that graduates work at after graduation.
2. The participant noted that the companies are already ordered from highest to lowest number of students.
3. The participant started reading the company names in *ascending* order instead of *descending* order of the number of students employed at each company
4. The participant corrected himself and started reading the number of companies in the right order from highest to lowest.
5. The participant successfully completed the final third task.

Feedback from Ben Williams:

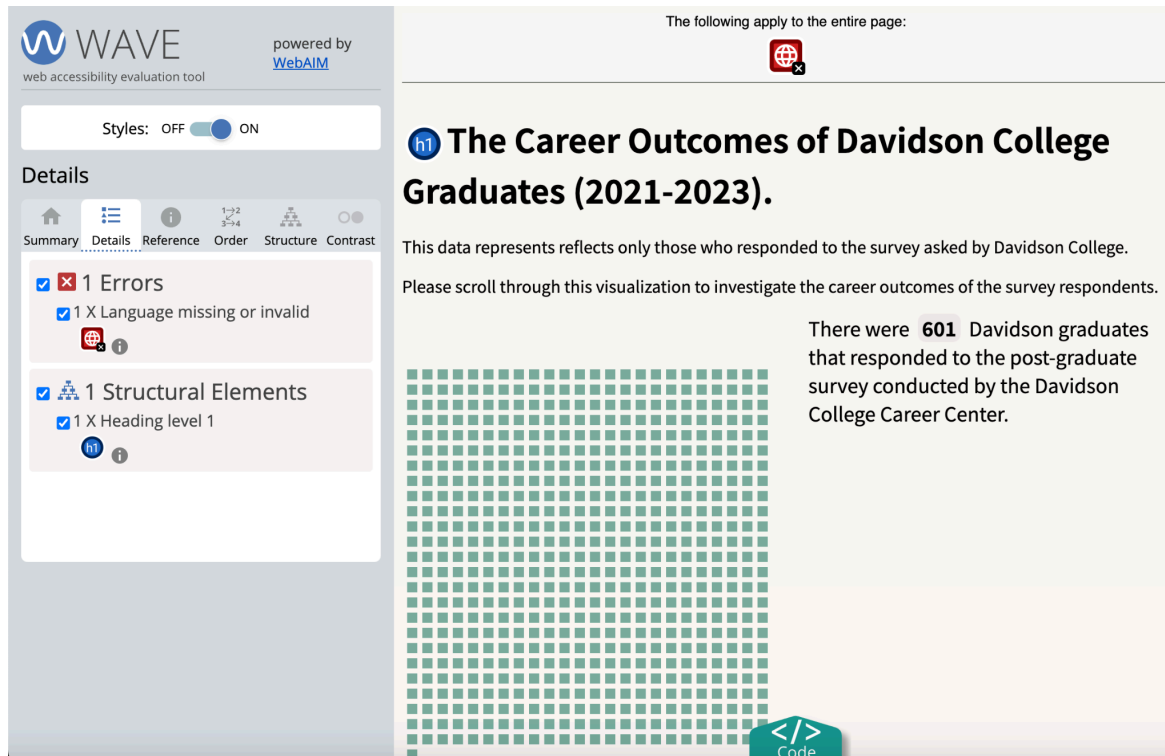
Overall, he liked our visualization a lot. He said it made a lot of sense and was very intuitive. Ben stated that if he knew about the scrolling, then he would have been able to answer the questions with ease. Furthermore, Ben stated that a title and legend for the map would be helpful.

He would not have known what he was looking at for the map had he not had the context of the first task. Although it was intuitive that a darker red indicated more survey respondents employed in a state and the tooltip aided in this understanding, it would still be helpful to have a sense of scale.

WAVE Screenshots:



Screenshot 1: Testing WAVE on the map visualization.



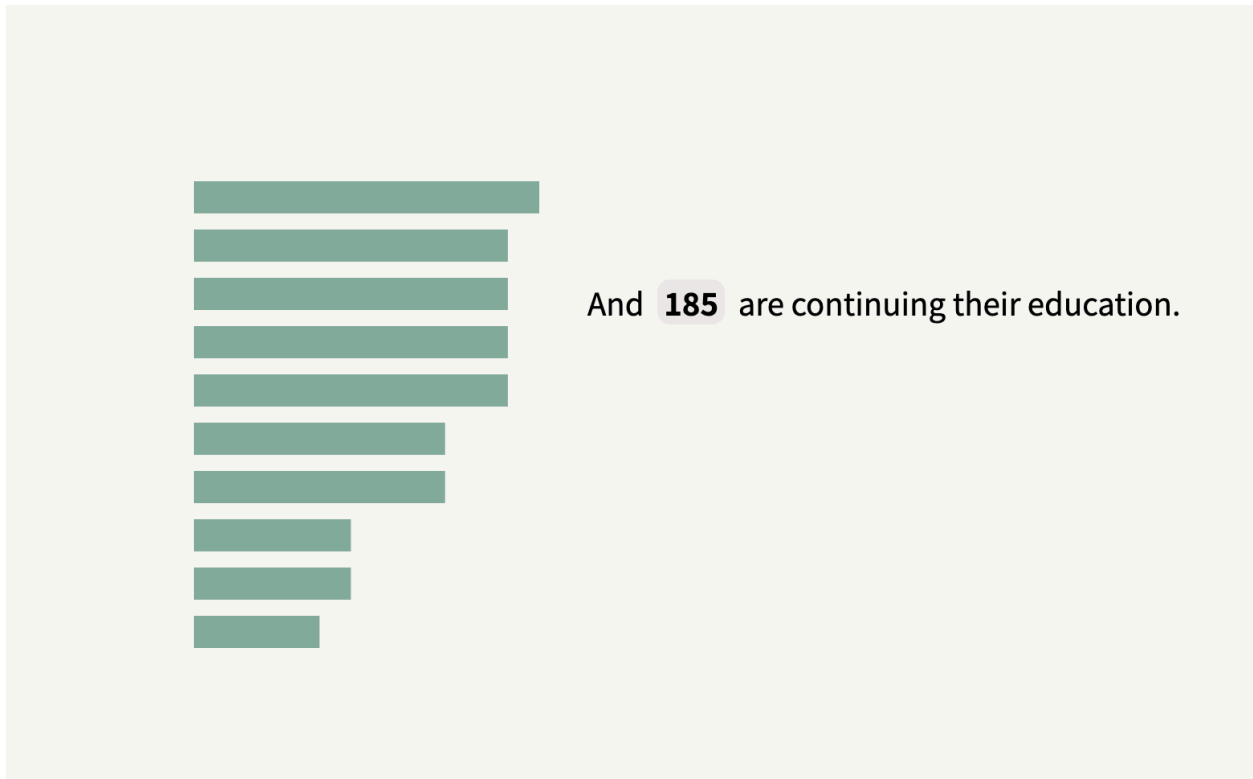
Screenshot 2: Testing WAVE on the scrollytelling visualization.

List of Changes to make:

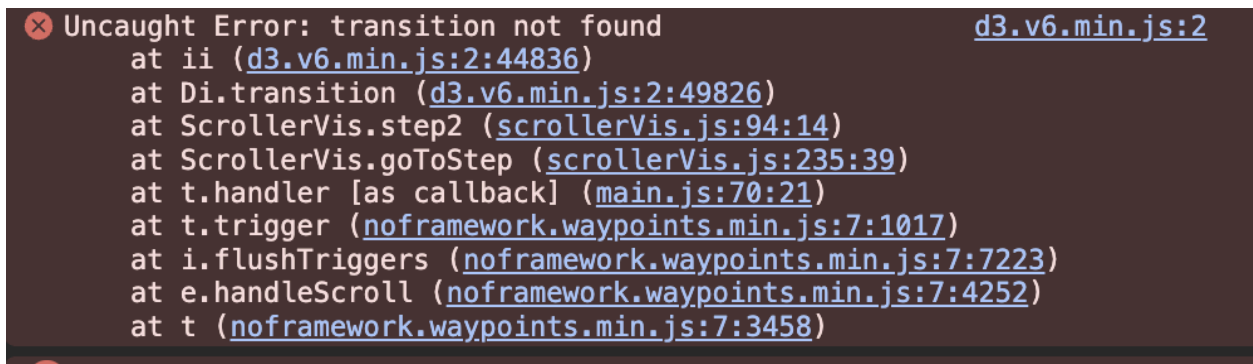
- The biggest change needed to be made to our visualization is letting the user know that they are able to scroll for the scrollytelling visualization. Testing the visualization has become second nature to us, so we understand that the visualization is built around scrolling. We did not let the user know about this functionality on the page itself. This is the first change we have made.
- The second visualization with the US map does not have a title or header that explains what the visualization is about. If we didn't specify in the question what the numbers meant and what the visualization is showing, the user would not have been able to successfully navigate through the visualization and let alone complete the assigned task of determining the range of the state with the highest number of students post-grad to the state with the lowest number of students post-grad. We made sure to fix this problem for the final iteration of the visualizations.
- Besides the problem of not having a title, the second visualization does not have a scale to inform the user whether a lighter luminance of red indicates a higher number or lower

number and the same thing for a darker luminance of red. Without hovering over the map, the user intuitively conjectured and figured out that North Carolina (NC), with the darkest shade of red, has the highest number of students. However, this might not be the case for every user. Therefore, to fix this issue, we will add a scale next to the map to make sure the user understands that a darker luminance of red represents higher number of students and vice versa.

- Another change that we need to implement are the adjustments to pass the WAVE reader. Both visualizations failed with one error each; the map visualization failed with a “1 X Missing or uninformative page title” error, and the scrollytelling visualization failed with a “1 X Language missing or invalid”. The first error is an easy fix, we include a title at the top of the html. For the second error, we had to do some research into what it meant. The WAVE test identified a missing section of our HTML page. We did not include a “lang” tag in the top-level HTML code. Both of these are simple fixes that we will finish for a final visualization.
- One bug of concern in the scrollytelling visualization code appears between steps 3 and 4. The first 3 steps investigate one data set, while step 4 begins to investigate a different data set. The bug occurs if a user scrolls up from step 4 to step 3:



Screenshot depicting how the page crashes.



Screenshot depicting the console error.

This fix will require us to find a way to join the rectangles with the dataset from steps 1 to 3 before scrolling up to the previous step. The cause of this issue is that the appropriate data set is joined to the rectangles in step 1, used in the next two steps, and then a new data set is joined to the rectangles in steps 4 and beyond. Therefore, when the user scrolls up to step 3 from step 4, the rectangles have no data joined to it.

- The last issue that we are attempting to fix is joining the two visualizations together. Our vision is that the map will be at the top of the scrolly-telling visualization; however, when joining the code together, issues arose. The code that reads in the map data set reads in each row as a separate object. If we write a message to the console when reading in this data, this message will be logged 51 times. We do not know what the cause of this issue is; if we remove the scrollytelling code, it is read in as an array of 51 objects, and the same message is only logged to the console once.
 - Our final solution to combining the two visualizations will be to create two separate .html files, and link them together with a navigation button. The user can switch between the two pages with ease, and investigate the data as they see fit. Although this goes against the visualization principle that comparisons using your eyes are better than comparisons using your memory, we cannot come up with a solution that combines the two visualizations on the same page in the time that we have left for this project.

6. Final visualization

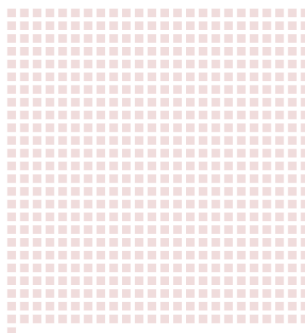
<https://tyleryandt.dcreate.domains/final/final-vis/index.html>

Final Visualization WAVE Tests

[View Map](#)

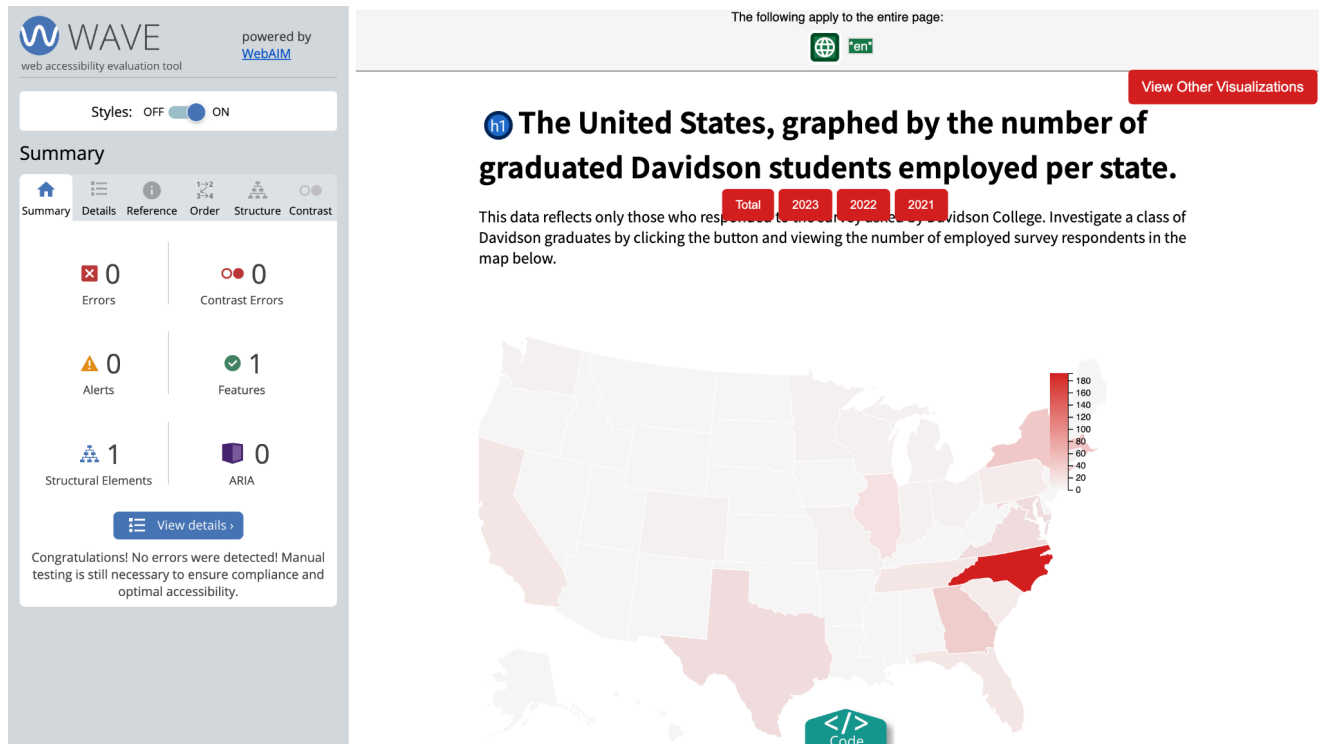
The Career Outcomes of Davidson College Graduates (2021-2023).

This data reflects only those who responded to the survey asked by Davidson College. Scroll through this page to see different visualizations regarding the survey's responses.



There were **601** Davidson graduates that responded to the post-graduate survey conducted by the Davidson College Career Center.





Final Visualization Accessibility Analysis:

The user is still able to accomplish two of our listed tasks when the screen is at 400% zoomed. These two tasks are finding the range of students employed in the 2023 across the states, and comparing the number of students that are continuing their education and the number of students that are employed. To find the range, if the user moves to the map visual page (a user is still able to navigate here if the zoom is at 400%), then filter the data to the 2023 graduates, the user can maneuver around the map to find the state with the lowest number of graduates employed in it, and the highest. This range is 58 (North Carolina) to 0 (any state with 0 employed graduates). For the comparison task, if the scrollytelling visual is zoomed to 400%, the rectangles go away. However, if the user scrolls through the prose, they will find the values for the respective groups of students (employed and continuing education), and are successfully able to compare the values. To confirm this, we will have a user attempt to complete these tasks at a 400% zoom.

7. User Testing

Testing Participant

- Name: Adriana Risi
- Class Year: Junior
- Major: Math
- Minor: Russian

First task:

1. The participant asked the speaker to repeat the question (implying that she was confused by the wording of the question)
2. The participant paused for a good 10 seconds before she started to move the mouse
3. The participant realized that she can scroll through the page and exclaimed “Oh, I can scroll up and down!”
4. The participant claimed that she was very confused what the first visualizatio with 600 squares meant.
5. The participant scrolled down to the section “416 of these survey respondents are currently employed” and noted that 416 students are employed
6. The participant continued to scroll down and found out that 185 are continuing their education. “416” students are currently employed
7. The participant concluded that there are more students who are currently employed as opposed to continuing their education
8. The participant successfully completed the first task with trial and error

Second task:

1. The participant clicked the “View Map” button to switch to the map
2. The participant started to hover over different states on the map and noted that North Carolina has the highest number of students at 192.
3. The participant then realized that she can click the buttons above the map to filter the data based on class year

4. The participant clicked the button 2023 to filter the map with the class of 2023 data
5. The participant hovered over North Carolina and noted that North Carolina has 58 students
6. The participant then started hovering over other states on the west coast and south and realized that some states have zero students moving there
7. The participant did the math verbally and came up with the range of 58 (0 to 58) for the class of 2023
8. The participant successfully completed her second task

Third task:

1. The participant
2. The participant accidentally scrolled all the way down to the section that said “The top 10 programs that graduate survey respondents are continuing education at.”
3. The participant requested the speaker to repeat the question
4. Upon hearing the task again, the participant scrolled up to The top 10 companies that graduate survey respondents work at
5. The participant started naming off the companies and the number of students that are working there in descending order
6. The participant successfully completed her final task

Summary and Feedback from Participant:

Questions were worded poorly, which caused confusion. Adriana really liked the scrollytelling visualization with the bar graphs, and thought the map was very clear. Adriana had a strong performance in our tasks; we believe the missteps of her performance is due to the phrasing of the questions, and is not indicative of our visualization. We had to repeat our tasks a couple of times to her. We believe that if the questions were laid out in front of her, sort of like a homework assignment, that she would be able to complete them with ease. Overall, she successfully completed the task at the end with some trial and error.

Testing Participant

- Name: Ellie Taylor
- Class Year: Senior
- Major: Art History

First task:

1. The participant began by asking a clarifying question. She did not understand the scrolly-telling aspect.
2. The participant started scrolling through the visualizations and understood the functionality.
3. The participant was able to give an answer to the task: “more people are getting employed than continuing their education.”
4. The participant did compare the values but did not explicitly state the actual values. We believe that this is an issue with our script rather than our visualization. The exact values are listed to the right in the prose.

Second task:

1. The participant asked if the “View Map” button will direct her to the US map with each state
(we did not answer her question so she can figure it out herself)
2. The participant clicked the View Map button and was very happy that it worked
3. The participant did not click the 2023 button to filter the data
4. The participant incorrectly said the range is 180 based on the Total map scale. She looked at the scale on the right hand side of the map and thought that 180 was the max.
5. The participant seemed confused and asked us to repeat the question
6. The participant realized that she can click the buttons on top to filter the data according to class year
7. The participant proceeded to press the 2023 button

8. The participant started hovering over and realized that it displays the number of students at each state
9. The participant was pleased that each state's information was displayed when hovered over
10. The participant noted that North Carolina has the most number of students, which is 58
11. The participant hovered over the west coast and states near the west coast and realized that there are states with zero students
12. The participant summarized her findings and concluded that the range is 58 because 58 minus 0 is 58.
13. The participant successfully completed her second task

Third task:

1. The participant started off by asking a clarifying question about the task. She asked if she has to look at the top 10 companies in descending or ascending order
2. The participant scrolled down the relevant section in the scrollytelling vis
3. The participant started naming the top 10 companies in descending order but did not explicitly mention the number of students at each company
4. The participant successfully completed the final task

Summary and Feedback from Participant:

Ellie asked us “what’s going when you first look at it?” However, she also stated that once she scrolled, she completely understood what was going on, and that she really liked it. She didn’t know that you could scroll initially. Despite being confused by the scrollytelling format, she quickly adapted and figured things out on her own. She navigated through the map and scrollytelling with ease and quickly identified the pieces of information she needed to complete the tasks. Overall, she did a great job completing the three tasks.

Testing Participant

- Name: Cato Röell
- Class Year: Senior

- Major: Philosophy

First task:

1. Cato was confused by the squares, saying that they did not have any meaning (referring to the initial step in the scrollytelling. We elaborate on this feedback more in the summary.)
2. She stated that “this could be easier.”
3. “Clearly a lot more people are employed than continuing their education.” This was her response to the task. Similar to Ellie, she did not state exact values, but, again, this is an issue with our phrasing and not the visualization.
4. Again she stated “I think there is an easier way to do this,” referring to the way in which we visualize the information.
5. She “loved the creativity” of the scrolling.

Second task:

1. Cato scrolled through the entire visualization and said it doesn’t say anything related to the states.
2. We gave her a hint about the button in the top right corner, and she realized she can view the map there.
3. Cato asked to repeat and rephrase the question.
4. She hovered over North Carolina and found 58, and found all the other states with 0 students employed in each. Therefore, she stated that the range was 0 to 58.

Third task:

1. Cato noted that the top 10 employers are already ordered in descending order, and then listed them off.

2. When we asked her to complete this task, she remembered that the scrolly-telling visual had something about the companies, and immediately went back from the map page to the other page and found the bar chart.

Summary and Feedback from Participant:

When we asked Cato the second task, she was unable to complete it without guidance. She said “there isn’t anything about states,” referring to the scrolly-telling visualization. This is true, and we should have been clearer on the final visualization about the interaction between the two pages. We told her “there’s a button you can click,” and then she was able to complete the second task.

Cato had similar feedback to Ellie; she didn’t understand the scrolling at first, but once she began to do so, she thought it was cool. Tyler asked her what she thought would give a clearer explanation; he said that we tried to explain the scrolling aspect in the first paragraph. She responded with, and we quote, “oh honey, no one reads.” This lead us to believe that some sort of tutorial when the page is first loaded would be beneficial; however, we do not have time to implement this change.

Cato thought that the scrollytelling aspect could be clearer. She poised questions like “what’s the point?”, and had feedback such as “it could be easier.” While we agree, the visuals could be more direct and have a better explanation, we wanted to try something that we enjoyed from the class, from lab 8, and we believe we implemented it well.

Cato was also a special participant because we asked her if she thought she could complete these tasks when the screen was zoomed to 400%. She immediately went to the map visual, and was able to find the range of states easily. She was unable to do the other tasks without aid; thinking aloud, she said “where did the bars go?”, referring to the scrolly-telling visual. This we agree with; we do not know how to fix the bars disappearing at a higher level of zoom. However, once we pointed out that the values are in the prose to the right, she was able to complete the comparison task.

8. Personal Reflection

Davin

I think I learned a lot from this final project in terms of how to implement a map visualization (which we ended up not doing in class) and how to work with scrollytelling visualizations. Although we initially planned to implement other types of visualizations, I am glad we pivoted to working with scrollytelling because it added a layer of complexity and made it more interactive and visually appealing for each transition. I think working with the Career Center's scrapped data also turned out to be a rewarding experience because we successfully improved their old visualizations that originally did not display the data in a meaningful way. With our scrollytelling and map visualization, we were able to use different marks and channels to allow the users to complete the given tasks and gain meaningful insights. Moreover, we were able to directly apply what we learned in class to our final project and learn new skills in d3 as well as html, css, and javascript.

One of the hardest challenges we faced when creating these visualizations was integrating my code (the map visualization) with Tyler's code (the scrollytelling). The process wasn't seamless as we had different id tags and structures. In addition, every time we solved one problem it led to another bug or error, which needed help from Dr. Williams to debug and fix. At the end of the day, however, we figured how to merge our codes and make sure our visualizations were up and running.

Finally, working with other students outside this class to test our visualizations made me realize how hard it is to make visualizations effective and easy to understand. We thought making the transitions look nice and smooth and adding more interactivity would improve the user experience. From the testing stage, we quickly learned that users need more directions and visual cues to direct their eyes and vision to what we want them to see. Overall, this was a great learning experience and I hope to continue working on something similar to this project in the near future.

Tyler

I found this process to be extensive, but rewarding. The process of designing a visualization and testing it on people outside of our class brought a new lens to the scope of visualization; we didn't want to pilot our visualization with a student from our class in order to receive feedback from someone that this was all new to, especially the scrolling aspect of the visualization. Davin and I grew so comfortable with the code that we wrote that when Ben gave us feedback on it, it opened our eyes. It totally makes sense that someone doesn't understand that more visuals come up as you continue to scroll through the visualization, but as I was coding that section and testing it for hours, it was like second-nature to me.

I also enjoyed implementing something that I found interesting from the class. While the scrolly-telling may not be the most practical way to visualize information (thanks Cato and Ellie for bringing this to light), I thought that it was an interesting way to do so. It was also satisfying to see the finished product come to life after the amount of extensive debugging and attending office hours sessions. Although it wasn't exactly the vision that we had for the visualization, I believe that it is a nice compromise of time spent debugging to functionality. A navigation button between the two pages versus spending who knows how many more hours fixing the combined code seems like a fair approach to me.

Gathering the data was also an eye-opening experience. I have gathered and processed real-world data before, but this project was a good reminder that not often will you find a data set that is instantly ready to go for whatever visualization you want to implement. It took me a while to come up with a solution to group the data by categorical variables. Manually collecting the data from the Career Center's website was frustrating. Why do they need to separate the tables by major, and then separate the table into sections, "continuing education" and "employed"? I don't know, maybe it makes it look cleaner, but it also makes it so much more frustrating to gather.

Overall, while this project has consumed my time over the past couple of days, it was very rewarding to see it come to fruition, and it is a project that Davin and I are proud of.