Project 4 - Is the worldwide gender gap in education changing? If so, how?

Summary

In 2000, at the World Education Forum, the United Nations created the Girls Education Initiative (UNGEI) to address the global inequity in education between girls and boys. The UNGEI seeks to promote measurable change in girls education and gender equity and to raise awareness of concerns for the most marginalized. These visualizations seek to answer the question, is the gender gap in education changing, and if so how?

Design -

First Draft-

Since I am talking about worldwide trends, I definitely need to use the map plots. In choosing the colors for the map I want the countries that have an average of under six years to be a different color. I am avoiding using green and red because of color blindness, so I'll use the blue orange scale. The orange end will correspond to the lower averages, and the darker blue will represent the higher averages. I will make four maps: women - 1970-1999, men- 1970-1999, women- 2000-2009, men 2000-2009[1]. I put all four maps on one page because I wanted to be able to draw comparisons between all the maps easily.

Just in case the maps weren't clear, I want to provide a line graph of mean years in school for boys and girls over time. I'm going to break it down by region because 185 lines is too much!
I had originally wanted both male and female lines to be together on the same graph and you could toggle between the regions, but I couldn't figure out how to do it and I actually like seeing the trends in all the regions all at once. However I felt that the difference in growth wasn't 100% clear. I created a calculated value called 'difference in mean years'. I calculated it by subtracting the mean years in school for girls from boys. I then plotted the difference over year by region to see if the gender gap is changing. I put both of them together on the same page because I felt that they were related pieces of information.

Action items from feedback
- Use the caption layout.
- Make caption blocks large enough to include whole caption so no scrolling is necessary
- Add 'click on boxes for details' textbox to instruct viewers on how to use Tableau.
- Page 1
    - Delete Avg. Male legend
    - Split into two pages, one with 1970 -1999 data, the second with 2000-2009 data.
    - Move legend to top of the page to ensure visibility
- Page 2
    - Recolor regions so Red and Green are not next to each other.
    - Adjust axes labels so it is clear which on is male and which one is female.

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[1] Unfortunately my data only goes up to 2009. If I had more time I would append the data from UNESCO stats

- ○ Add primary school completion line at 6 years (it is different worldwide, but my audience is predominantly if not solely american so primary school ends at 6th grade.) I don't want to add middle school and secondary lines because I think they will clutter the graph and one of UNGEI's agenda items is to promote post primary opportunities for girls.
  - ○ Place graphs side by side, that way the lines for Asia and Pacific and Latin America might diverge a bit.
  - ○ Make sure both graphs have the same axes and proper labels.
- ● Page 3
  - ○ Move line graph to its own page.
  - ○ Put a second bar graph in place of the line graph so you can compare two years. (Use the single item drop down menu for ease of selection)
  - ○ Make the bar graph axis fixed so the changes from 1970 to 2009 are more noticeable.
  - ○ One next page, have the over all line graph and a bar graph of average difference for the individual countries in each region (Arab States and Africa)

Feedback -

I gathered feedback from my family (my father is colorblind), my former colleagues (educators at an all girls school), and friends (people with no vested interest in the data).
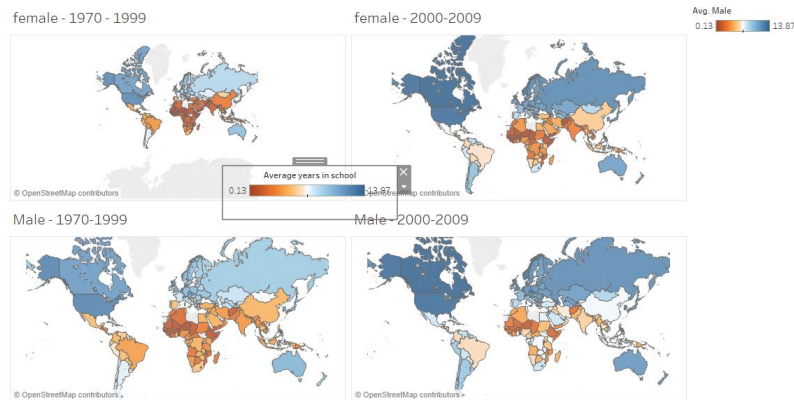
Color
2 out of 8 of my respondents are colorblind and they reported no issue in distinguishing colors in the various visuals. 100% of respondents felt that the colors enhanced the graphs and aided in telling the story.

Layout
I had opted for the dots layout because my first page had so much on it. Many of my respondents said that they were confused by the dots and thought there was only one page! There were also some formatting issues with my legends. I had opted to float many of my legends so give the graphics more space, but in doing so, it blocks out some information on some graphs. Since I'm simplifying some of my pages due to feedback, I will use the caption method to make it more obvious that there are more pages and provide some background on the visuals.

female - 1970 - 1999
female - 2000-2009
Male - 1970-1999
Male - 2000-2009

Avg. Male
0.13   13.87

Average years in school
0.13   13.87

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- Avg. male scale needs to be moved to male maps
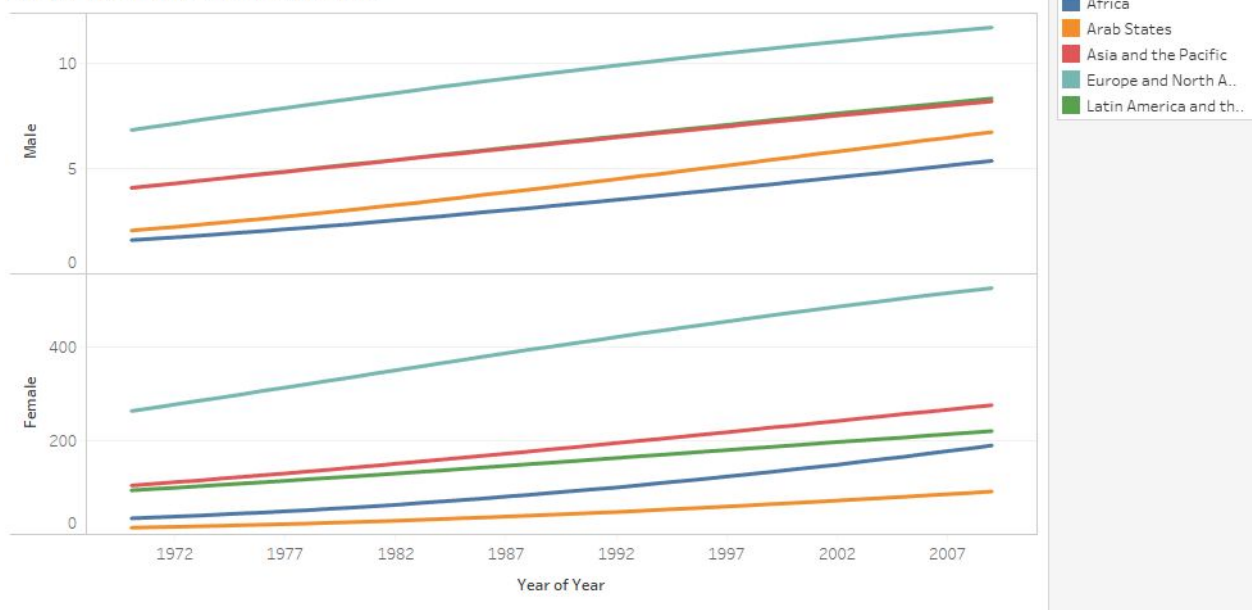 - Honestly, I totally forgot to delete it. The one color scale applies to all four maps.

- The maps page was too small to see the detail of the countries for Africa and Latin America. I would recommend doing it in two pages with the first data group of male and female on one page and the second on another page.
  - Totally agree. I got advice on how I should split it up and the consensus was 1970-199 male and female on one page, 2000-2009 male and female on second page.
- The orange gradient is a little fuzzy, hard to distinguish between some of the countries.
  - When I explained that these graphs are more to get an overall impression, not a pinpoint accurate comparison, the respondent retracted their statement.

Mean Years in school over time

UNESCO region
- Africa
- Arab States
- Asia and the Pacific
- Europe and North A..
- Latin America and th..

Year of Year

- I think you mean 'year over year' not 'year of year'
  - Another careless typo. I forgot to check all my axes before exporting. How embarrassing.
- What happened to Latin America for the males?
  - In this layout the graphs for Latin america and Asia pacific regions are essentially the same. Will try out a different layout to see if the difference is more apparent.

- Dark Green and Dark Red being very close together were had to see but may have been due to my color vision issues
  - I will assign different colors to the regions to prevent their confusion.
- It would be helpful to have horizontal lines representing primary school completion and secondary school completion levels.
  - That is a FABULOUS idea!

Page three
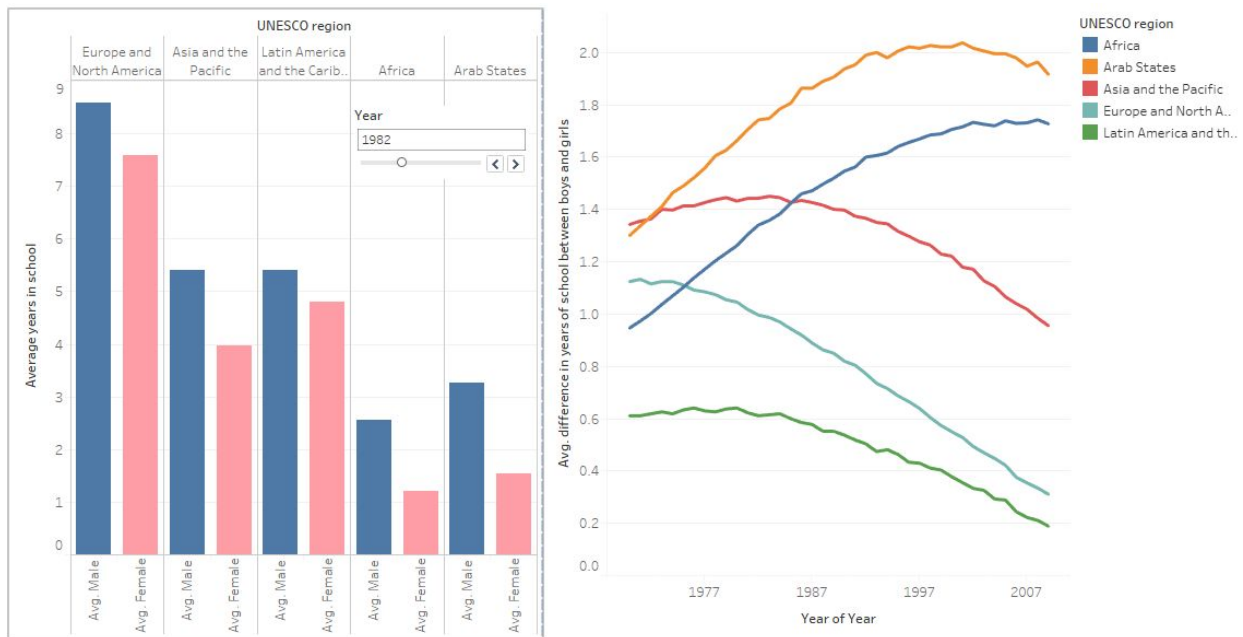
- At first, I didn't realize that I could change the years in the bar graph so the line graph seemed more informative for answering the overall question. Then I started playing with the years in the bar graph-- that was really neat.
  - Sweet!
- Bar graph is hard to see changes year over year as changing year moves slowly. Love the line graph – makes it easy to read. Suggest you flip the two so people focus on the line graph first and go to the bar for more detail.
  - I have a sheet that I didn't use that has a map plotting the differences in the world. I could put the line graph on its own page with maybe a break down of the Arab states and Africa countries and have the bar graph and the world map on this page. That way everything on the page is dynamic and exploratory and the next page is summative and explanatory.
- Year toggle is blocking the region title
  - Better move that then!

Interpretation questions:
- What conclusions have you drawn?
  - I see that the gender gap is unfortunately increasing in Africa and the Arab States, although maybe it has plateaued in Africa.

- - Overall the trend shows that females are spending more years in school than they were in the 70s
  - Gender gap is decreasing for three of the five regions but increasing for Arab and African regions
  - Gender gap is increasing in African and Arab regions and decreasing in the others
  - It's getting better, but there's a long way to go.
  - Generally the gender gap is decreasing, but this story opens up so many more questions for investigation!
- Do you have any questions about the data?
  - Where did the data come from
    - Valid point, I hadn't given them my summary statement. Opps.
  - Does the data take into account a person's lifetime or only specific years of their life?
    - This data is from a survey of persons over the age of 25. It would be interesting to incorporate life expectancy in further investigations.
  - This is ten year old data. Is there anything newer?
    - Valid point. The Gapminder data that I used only went up to 2009, but I did find current UNESCO data up to 2017, but due to time constraints I think I will have to wait until after i complete this course to add it in. I want to finish on time and I think I have a good start with the data that I have.

Resources

- Dataset: taken from the Gapminder.org
  - Mean years in school (men 25 years and older)
  - Mean years in school (women 25 years and older)
- Jupyter notebook used to tidy data
- United Nations Girls Education Initiative - www.UNGEI.org
- United Nations Educational, Scientific, and Cultural Organization - www.UNESCO.org