effectiveplots_summary

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PART I - Principles

Principles for Creating Effective Visualizations

Quick tips for Getting Started (Exploratory Phase)

1. Tidy data!
2. List variables
3. List data types & relationships of interest
4. Produce many, quick visualizations

Helpful chart chooser: https://www.data-to-viz.com/#explore

Principles for Effective Visualization (Presentation Phase)

1. Articulate the main idea your graphic should convey FIRST
2. Run through checklist of best practices

- Avoid Common Pitfalls of Misleading Graphs
  –
- Go for Simplicity
  –
- Look at Text
  –
- Look at Color
  –

3. Test your graphic on others – with no hints

PART II - Applying Principles + Visualization Resources

Applying Effective Visualization Principles in R

Going to be using RStudio on myadroit.princeton.edu.
Before launching RStudio, need to load packages on head node of Adroit.

Upload Dataset in Adroit

Create 'effectiveplots' directory.
Upload files.

Install & Load Packages

On Adroit's head node:

```
ssh <netid>@adroit.princeton.edu      # Log into Adroit.
module load rh/devtoolset/8           # Load modules.
R                                     # Start R.
```

Once in R:

```
install.packages("dplyr")
install.packages("gpplot2")
install.packages("scales")
```

NOTE: Package installation only needs to be done once.

Open RStudio on MyAdroit

```
library(dplyr)      # to manipulate data
library(ggplot2)    # to make plots
library(scales)     # to use use "commas" in label argument for scale_y_continuous()

# load in dataset
d_covid <- read.csv("effectiveplots/covid_pop_latlong_2020-07-23.csv")

# get variable names
names(d_covid)
head(d_covid)
```

Default Plot

ggplot - Data, Aesthetics, Geometries

"An aesthetic is a visual property of the objects in your plot. Aesthetics include things like the size, the shape, or the color of your points."

```
ggplot(data = ) +
  geom_col()
```

Improved Plot

```
# Adjustments to Data
#**********************
# for AVOID COMMON PITFALLS OF MISLEADING GRAPHS
# to arrange bars from highest to lowest
d_covid_gg <- d_covid %>%
  arrange() %>%
  mutate()

# for COLOR
# if want to highlight nj
d_covid_nj <- d_covid %>%
  filter()

# Plotting
#**********************

ggplot(data = d_covid_gg) +
  geom_col(aes(x = state, y = total_cases)) +
```

```
  # 1. ARTICULATING MAIN IDEA
  # Add labels
  labs(title = "",
       subtitle = "",
       caption = "") +

  # 2. BEST PRACTICES

  # AVOID COMMON PITFALLS OF MISLEADING GRAPHS
  coord_flip() +
  scale_y_continuous()  +

  # SIMPLICITY
  theme_classic() +
  theme(
    panel.background = element_blank(),                # remove color of background panel
    panel.grid.major.y = element_blank(),              # remove major Y grid lines
    panel.grid.major.x = element_line(),               # define major X grid lines
    panel.grid.minor = element_blank(),                # remove minor grid lines
    axis.line = element_blank(),
    axis.ticks = element_blank(),

    # TEXT
    plot.caption = element_text(),
    plot.title.position = "plot",
    plot.caption.position = "plot",
    plot.title = element_text(),
    plot.subtitle = element_text(),
    axis.text = element_text(),
    axis.title.x.bottom =  element_text())
    ) +
  ylab("") +
  xlab() +

  # COLOR
  geom_col(data = , mapping = aes())
```

Save Your Plot

```
ggsave("<insert-your-file-path>/covid_nj.png")
```

Resources

ggplot2 cheatsheet
https://rstudio.com/wp-content/uploads/2015/03/ggplot2-cheatsheet.pdf

ggplot2 Main Page
(see section 'Learning ggplot2')
https://ggplot2.tidyverse.org/

ggplot2 Themes
https://ggplot2.tidyverse.org/reference/theme.html

ggplot2 Theme Elements

https://ggplot2.tidyverse.org/reference/element.html

Various graphs and corresponding code, made in R with ggplot2:
https://www.r-graph-gallery.com/index.html

Need help? Visualization Services at Princeton

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PRINCETON INSTITUTE FOR COMPUTATIONAL SCIENCE AND ENGINEERING (PICSciE)

Area of expertise: General visualization (exploration / design / creation / storytelling / troubleshooting) and GIS training and support
https://researchcomputing.princeton.edu/systems-and-services/visualization

PICSciE/Research Computing's Visualization Staff

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Help Through Email
cses@princeton.edu

In-Person Help
Help Sessions (usually 245 Lewis Science Library, now on Zoom)
Tuesdays 10:30 – 11:30 am
Thursdays 2:00 – 3:00 pm
https://researchcomputing.princeton.edu/education/help-sessions

Project Consultations
Have a visualization you or your group would like to build, but want help getting there?
You can apply to work with our visualization analysts over a semester to help you build the visualizations you need.
Contact Carolina Roe-Raymond at (c.roe-raymond@princeton.edu) to apply.

Workshops
https://researchcomputing.princeton.edu/workshops

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GEOGRAPHIC INFORMATION SYSTEMS AND REMOTE SENSING AT PRINCETON UNIVERSITY; MAPS AND GEOSPATIAL INFORMATION

Area of expertise: GIS training, support, and data
Library: https://library.princeton.edu/collections/pumagic
Research Computing/OIT: https://researchcomputing.princeton.edu/vis-lab/gis

Staff
Tsering Wangyal Shawa
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Training available through. . .

- Princeton courses
- Workshops
  - Register at: http://library.princeton.edu/collections/pumagic/workshops
- Esri self-paced e-Learning classes
  - http://training.esri.com, contact Wangyal or Bill

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CeDAR

Area of expertise: Tableau training and support
https://cedar.princeton.edu/

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VIS-E LAB

Area of expertise: Ethnographic data visualization
https://anthropology.princeton.edu/research-programs/vize-lab

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DATA AND STATISTICAL SERVICES

Area of expertise: Data and statistical consulting
https://dss.princeton.edu/

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STOKES LIBRARY - STOKES VIZ HUB

Area of expertise: Digital research and data visualization grounded in qualitative analysis
https://library.princeton.edu/stokes/stokes-viz-hub

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OFFICE OF POPULATION RESEARCH

Area of expertise: Offers workshop on graph design (among other topics)
https://opr.princeton.edu/workshops/